

Workbench



MAY
JUNE
1961



WORKBENCH



ALL ABOUT KARTS

Build The Workbench Kart
How To Lay Glass Blocks
Use A Plug Chuck In A Lathe

Turnings From Logs
Modern Pine Secretary
Concrete Garden Bench

Your Very Own Personalized Note Paper and Matching Envelopes!

PRINTED WITH YOUR
NAME AND ADDRESS
50 Note Sheets ONLY **\$100**
25 Envelopes

YOUR NAME
AND ADDRESS

YOUR NAME
AND ADDRESS

\$100
per set

SEND ORDER TODAY!

Here is an opportunity to have your very own personalized note paper and matching envelopes. Printed with your name and address on beautiful white ripple stock. It's just the thing for dashing off little notes of thank you, sympathy, get well, congratulations, or simply to say hello. Be sure to send your order early. Simply fill out the coupon below giving us the name and address as you want it to appear on your stationery and also the name and address where it is to be shipped. Specify "personalized" stationery (comes in white only).

SPECIALLY PRICED FOR WORKBENCH READERS!

Fill out the coupon below giving complete information and mail with your remittance.

WORKBENCH
543 Westport Road, Dept. 1095
Kansas City 11, Missouri

Imprint:

Name

Street

City, State

Please print the name you wish imprinted in the above space.
Enclosed, \$_____ for _____ sets of stationery.
(Send \$1.00 for each set of stationery ordered.)
Ship stationery to:

NAME _____
ADDRESS _____
CITY _____ STATE _____

Wonderful for Gifts!

Order an extra set or two for gifts for close friends. These sets of personalized note paper and envelopes are ideal for gifts. If more space is needed for additional names, attach an extra sheet of paper. Be sure to specify clearly where stationery is to be shipped and names to be printed.



We have a very limited supply of a full color note paper in flower garden design with matching envelopes. On this note paper your name and address will not be printed. If our supply is exhausted before your order is filled, we will send "personalized" stationery unless you request us not to. If you want 25 note sheets and 25 envelopes in full color, specify "color" stationery. Use coupon at left and mail with \$1.00.

New Rubber Stamp Business Pays Beginners ^{UP} _{TO} \$9.20 an hr.

Start at home in spare time with this little table top machine

The multi-million dollar Rubber Stamp Business—once controlled by a few big companies—is now being taken over by small home operators—one in each community throughout the U.S. Men and women who have this inexpensive machine can turn out huge quantities of Rubber Stamps with special wording that buyers once were forced to order from big cities. Material costing only 27¢ makes a stamp that sells for \$1.80. The machine that does the work is simple and easy to operate and it turns out as many as six Rubber Stamps at a time each with different wording such as names, addresses, notices, stock numbers, prices and other "copy" needed by offices, factories and individuals. Working full capacity, it can earn as much as \$9.20 an hour for the operator! Now you can get into the big-pay business yourself, with your own home as headquarters. You don't need any experience. We supply everything, including complete instructions and eight ways to get business coming in fast. Start making up to \$9.20 an hour from the very beginning. Cash in on the profitable Rubber Stamp business in your community right away.



**TAKES UP
ONLY 2
SQUARE FEET
OF SPACE**

WE HELP FINANCE YOUR START IN BUSINESS

● Read the complete and fascinating Rubber Stamp-story in a big 110-page Book. Learn how we even help finance your start. The Book is profusely illustrated with more than 100 pictures and photographs. And you can read it for a full two weeks without risking a penny of your own money!

NEW WARNER SUCCESS PLAN

Here's what the new WARNER PLAN Tells You about Making Money with RUBBER STAMPS

1. **HOW TO** have fun now and at the same time provide for a secure and prosperous future.
2. **HOW TO** check the advantages of operating a Rubber Stamp Business in your own community.
3. **HOW TO** acquire a general knowledge of the business based on a brief history of the Rubber Stamp.
4. **HOW TO** visualize the scope of the Rubber Stamp market.
5. **HOW TO** make a Rubber Stamp (general outline).
6. **HOW TO** assess the value of Warner Equipment.
7. **HOW TO** get acquainted with the "Tools of your Trade."
8. **HOW TO** make a Rubber Stamp (Specific procedure).
9. **HOW TO** mount a vulcanized Rubber Stamp.
10. **HOW TO** make "Special" Rubber Stamps.
11. **HOW TO** cut plastic Matrix Board for the chase.
12. **HOW TO** get the right price for the Rubber stamps you make.
13. **HOW TO** price your complete Rubber Stamp Line.
14. **HOW TO** figure costs so you will be sure of a substantial profit on all the work you turn out.
15. **HOW TO** set up your workshop.
16. **HOW TO** get the most out of Warner's "Eight Tested Sources for Getting Business."
17. **HOW TO** operate at peak efficiency when YOU ARE YOUR OWN BOSS.
18. **HOW TO** get started on a cash outlay so small that you can get back your entire investment inside of two weeks.



**110 PAGES
MORE THAN 100
PICTURES**

**Now Ready to Mail
Tell Me Where to
Send Your Copy**

See

COUPON

Tells How to Build—Step by Step—to Big Profits and Personal Independence Read This Plan for Two Weeks ENTIRELY AT MY RISK!

In this amazing Plan you will find exact and detailed instructions for starting a Home Business in spare time—without giving up your present job and without risking the loss of a single pay check. The Warner Plan shows you—with pictures, photographs and drawings—just how to make Rubber Stamps just as good as those turned out by the big companies. It shows how to get orders without canvassing or house-to-house selling. It shows you how to expand, how to get others to work for you and how to be SURE of at least twice the money you make on your present job for a life of personal independence.

But don't make any decision now. Read the Plan first—entirely at my risk. Then—after you have made a careful investigation—after you have talked things over with your family—only then do you decide what you want to do.

The thing to do now is to get full details which I'll send you FREE. No salesman will call to urge you to buy anything. Mail coupon today—or just send a postcard—and I'll see that complete information goes out to you by return mail—postpaid.

**RUBBER STAMP DIVISION, Dept. R-6-E,
1512 Jarvis Avenue, Chicago 26, Illinois**

**RUBBER STAMP DIVISION, Dept. R-6-E, Send No Money
1512 Jarvis Avenue, Chicago 26, Illinois**

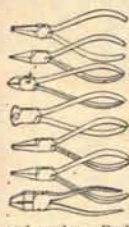
Please rush full particulars. Tell me about your financing plan and about the little machine that can get me started in the profitable Rubber Stamp Business at home in spare time. Everything you mail me is FREE. No salesman will call.

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

TOOLS AT UP TO 75% OFF



**75c ea. for finest quality
PRECISION PLIERS**
Flat Nose, Combination, Diagonal Cutter, End Cutting Nippers, Round Nose, One Side Flat—One Side Round, Snipe

FOR JEWELERS, OPTICAL WORKERS, HOBBYISTS, CRAFTSMEN OF ALL KINDS! These superb European instruments are of deep-forged heat treated high quality tool steel fabricated to most exacting specifications. Jaws meet perfectly to safely and securely hold even the most delicate objects in the hard-to-reach corners and angles. Each plier is 4" long and a veritable gem of precision and strength.

75c ea. — all 7 for \$5.00 ppd.



All-Purpose ROTARY RASPS

Cleanly and rapidly files, planes and trims wood, fibre, hardboard, plywood, leather, asbestos, rubber, plastics, nylon, etc. Specially hardened alloy steel with fast-cooling nylon core. Sharp cutting teeth. Perfect for grooving straight or irregular surfaces. Fits all 1/2" drills. 3/8" diameter by 7/8" wide flat; 3/8" wide half-round and 7/16" wide flat cutting surfaces. Specify when ordering.

\$1.98 ea. plus 25c postage
All 3 for \$5.75 plus 50c postage



Versatile RASP SANDING PLATES

Eliminates slow-working sandpaper—dies. Slips on to any 1/4" drill and does the job in less than half the time. Rasping surface remains constant because it is made of hardened alloy steel. For large area work as well as spot sanding. One does medium sanding, one does coarse. Use combination plate with coarse rasp outer edge for paint removal while cutting slots smooth any surface. Each 5" in diameter.

\$1.98 ea. plus 25c postage
All 3 for \$5.75 plus 50c postage



COVERALLS

In Handy Fold-A-Way Pack

One of the most comfortable, toughest wearing coveralls available anywhere! Custom designed, one piece, roomy cut tear-resistant construction. Full length zipper—goes on and off in an instant. 100% rugged, durable, lightweight, 100% waterproof! Not affected by oil, grease, mildew or ordinary chemicals. Guaranteed not to crack, stick or peel in temperatures as low as 30 degrees below zero. Indispensable protection against soiling clothes when changing tires. Ideal for Fishermen, Outdoor Workers, Gas Station Attendants, Hunters, Farmers, Delivery Men, Golfers, etc.

\$3.98 Plus 35c pp. & hdg.

ONLY In Small, Medium & Large. Specify when ordering.



29-Piece CHROME VANADIUM DRILL SET

Especially made for speed drilling. In sturdy plastic tool roll. Finest alloy steel drills hardened and precision ground to the sharpest, longest lasting cutting edge obtainable; will easily and cleanly bite through hardwoods, plastic, aluminum, iron and the toughest steels. Unconditionally guaranteed for thousands of drillings. Full jobber length. Sizes by 64th from 1/16 to 1/2". There is only a limited quantity of these imported German sets available at this low price, so hurry!

Now \$6.95 plus 35c pp. & hdg.

Also available with Turned Down Shanks to fit all 1/4" drills. In individual pocket roll **\$8.95 plus 35c pp. & hdg.**



60 Pc. Set CHROME VANADIUM Wire Gauge DRILLS

Top quality German import high test Chrome Vanadium Drills designed for speed drilling through toughest steels, woods, plastic, iron and aluminum. Precision long-lasting cutting edges. Now Only **\$5.95** Guaranteed to give years of satisfaction. A full 60 piece set Nos. 1 through 60.

\$5.95 plus 35c pp. and hdg.

Same set above available with Huet Metal index container **\$7.50** Only **\$7.50 plus 35c pp. and hdg.**

Also available — 20-PC. SET
Nos. 61-80 WIRE GAUGE DRILLS only **\$2.50 ppd.**



AMAZING NEW TOOL QUICKFIT CONTOUR MARKER

For Making Patterns
to Fit Any Irregular Shape!

A real boon to all Mechanics, Carpenters, Linoleum Layers and Do-It-Yourselfers! This handy new tool gives accurate measurements of hard to fit contours in an instant. Saves hours of time — assures perfect work without waste. Simply lay "Quickfit" against object to be fitted, push the sliding fingers into each groove or notch, snap lock — and presto, you have a perfect template to lay out your work. There are 19 solid lifetime aluminum "fingers" per inch — overall size 10" x 4 1/4" x 3/8".

Send Check or Money Order. If C.O.D., \$2.00 Deposit. Money Back Guarantee.

ALEXANDER SALES CORP.
DEPT. WO-561, 140 MARLBOROUGH RD.
TUCKAHOE, NEW YORK

WORKBENCH volume 17 number 3

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Fred Stebbins, Photographer

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PLEASE ACCEPT, WITH OUR COMPLIMENTS, THIS

"Christmas Money" Coupon

THIS COUPON GOOD FOR:

① **\$2.75** Worth of *for* **Greeting Cards** *Only* **25¢**
for Christmas and All Occasions

② Full details on how to earn, in spare time,
\$50 to \$250 between now and Christmas

HARRY DOEHLA and ASSOCIATES,
Studio W165

(Address any one of
these three offices)

NASHUA, N. H.
ST. LOUIS 1, MO.
PALO ALTO, CALIF.

As a Special Introductory Offer, please send me the GIANT \$2.75 assortment of Christmas and All Occasion Greeting Cards (98 pieces). I enclose only 25¢ as payment in full. Also send samples of your newest and most popular Christmas Card assortments on approval, and details of the famous Doebla "Extra Money" Plan. (Offer Limited to One to a Family.)

Name.....
(Please Print Clearly)

Address.....

City..... Zone
(If any)..... State.....

☐ Check here for Special FUND-RAISING Plan
for church, school, club or organization.
Please write name of organization:.....

JUST IMAGINE! The valuable coupon above is good for the giant 98-piece boxed assortment of Christmas and All Occasion greeting cards shown here (regular price \$2.75) — if sent with only 25¢ to help cover packing and mailing costs. In addition, it will also bring details on how you can earn \$50 to \$250 between now and Christmas in your spare time.

Why do we make this Special Introductory Offer? Because we want you to see how easy and pleasant it is to earn "Christmas money" with the wonderful Doebla "Extra Money" Plan. No experience needed.

To help you get started, with your giant box of cards we will also send you several other popular assortments on approval. Just SHOW these beautiful cards to friends and neighbors. They get real bargains. And you make up to 60¢ on every box they order — even more on certain gift and novelty items. Soon you have \$50 to \$250 to spend as you please! If friends don't snap up these bargains, send them back at our expense and pay nothing!

Mail The Above Coupon At Once

Mail valuable "Christmas Money" Coupon at top of page now — with ONLY 25¢ for your big \$2.75 Giant box of cards. It's yours to KEEP whether or not you do anything further about the Doebla "Extra Money" Plan! Address: Harry Doebla and Associates, Studio W165, Nashua, N. H., or St. Louis 1, Mo., or Palo Alto, Calif. (Address office nearest you.)

One of These Nation-Wide Associates Will Give You Prompt Service in Your Area:

Boulevard Art Publishers
Chicago 4, Ill.
Iva E. Brundage & Sons
Detroit 4, Mich.
Capitol Card Company, Inc.
New Orleans 12, La.

Columbia Card Co., Ltd.
Dallas 1, Tex.
Harry Doebla Company
Nashua, N.H. & Palo Alto, Calif.
Greetings Unlimited
St. Paul & Minneapolis, Minn.
Hye-Quality Card Co., Inc.
Kansas City 6, Mo.

Imperial Greeting Card Co.
Los Angeles 12, Calif.
Midwest Card Co.
St. Louis 1, Mo.
Western States Card Co.
Denver 11, Colo.

**Yes! You Get
This \$2.75 98-Piece
Assortment for Only 25¢**

Imagine! ... you get 98 useful items in this big box. It's a joy to have on hand, always ready for every greeting card need. Included in this Giant Christmas and All Occasion Box Assortment are generous quantities of cards for:

Christmas
Birthdays
"Get Well"
Sympathy

New Babies
Thank You
Gift Cards
Anniversaries

Children's ToyCards
Correspondence Notes, etc.

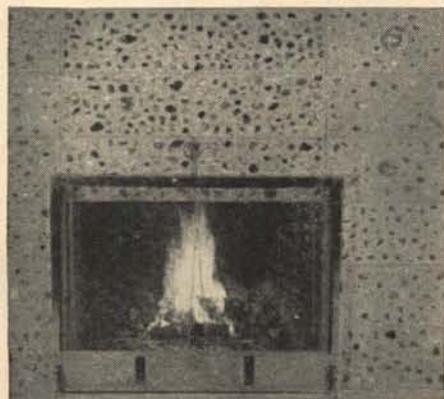
LETTERS TO THE EDITOR

CORRECTION

In the last issue in the article on the Moffat Multi-Lamps it was stated that five nylon buttons were provided with each lamp. Only one is furnished; extra buttons can be purchased. Lamps furnished us for testing did have extra buttons, which is the cause of our error.

We also learned that Multi-Lamps can be obtained with shades in three decorator colors: yellow, blue and pink. All columns are snow-white. The colored lamps are strikingly attractive as well as functional.

In the same issue our Mfr.'s Directory lists the maker of the Shopmaster tools shown in the lamp article incorrectly. The manufacturer of Shopmaster Tools is Shopmaster Div., Energy Mfg. Co., Monticello, Iowa.



Dear Mr. Editor:

You publish a very interesting magazine, but like most of them there is not enough information on unusual items. For instance, I am enclosing photos of a portable communion service I built for the use of the elders in our church for serving communion to sick and elderly people who cannot come to church, and of a fireplace in our game room. The concrete blocks are 9 x 18 in. and 1½ in. thick, set with pieces of agate, petrified wood, Apache tears, thunder eggs, red and green jasper and just plain beach agates all polished and set in the concrete while it is wet. Took a long time to accumulate and tumble-polish 1,445 of these items. As you can see, I much prefer to make an unusual item, rather than something easily made with a pattern. Please include a few unusual items in your magazine.

Q. J. Smart, Portland, Oregon.



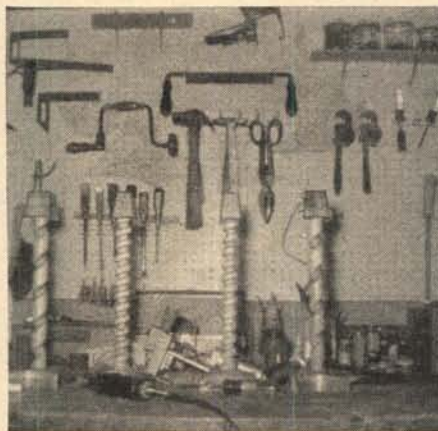
Dear Mr. Smart:

Your items certainly are unusual. Do any of you other readers want the unusual type of project? Please write and let us know. It is you, the readers, who determine what is published in WORKBENCH.

Gentlemen:

Enclosed are pictures showing the spiral candlesticks I worked out on my bench saw according to the article by Dick Hutchinson in the Nov.-Dec., 1959 issue. This is just one of the many good suggestions derived from the magazine. I have recommended it to many woodworking hobbyists.

Ben E. Lageson, Austin, Minn.



Dear Mr. Lageson:

Many thanks for the picture. We always are delighted to receive photos of projects made from articles in WORKBENCH. Your workshop looks quite complete also. Perhaps you can work up some projects for us to publish for other readers.

Dear Editor:

As a boy I spent my summers on the shores of Cape Cod building tree huts, rafts and sinkable boats. Maintaining my interest in building with

wood I went through high school and college, majoring in carpentry, drafting and industrial arts. At present I am teacher-coach in a high school where I coach baseball and teach woodworking and drafting. Have taught arts and crafts at summer camps, boys clubs and similar organizations. My boyhood hobby has become my lifelong profession. Ralph C. Mayo, South High School, Worcester, Mass.

Dear Mr. Mayo:

Our congratulations. It is not often that a man can make a full-time career of a hobby. Your enthusiasm for your job no doubt is communicated to the students who will learn the fascinating hobby of woodworking, and continue with it through their adult years.



Dear Mr. Hedden:

In your March-April issue there is a picture of a Grandfather clock made by Mr. Beardsley. Have been wanting to get mine finished and photographed so I could send you a picture. My clock is all maple and birch. Have not stained it as yet. Believe I'll use fruitwood or cherry. The clock is 93 in. high from floor to the top of the center finial. Am starting a Grandmother clock that will be about 72 in. high. Would like to correspond with Mr. Beardsley.

Linus R. Hurm, St. Marys, Ohio.

Dear Mr. Hurm:

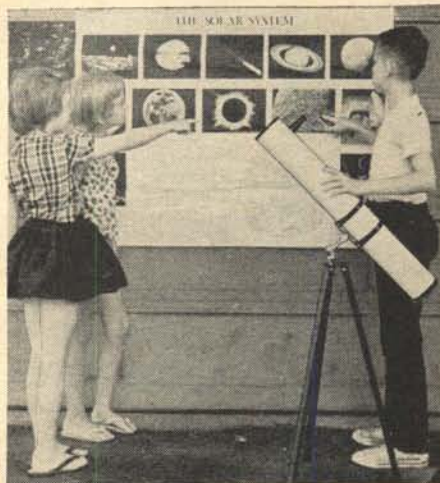
Your clock is beautiful. We know the many hours of meticulous craftsmanship required to build such a project, and congratulate you.

MANUFACTURERS' DIRECTORY

A directory will be published in each issue, on a back page, giving the name and address of manufacturers of products mentioned in articles.

Jay W. Hedden

Jay W. Hedden, Editor



Mysteries of the solar system are a lot easier to understand when you can see them, young teacher is telling sister and friend.

A LOOK AT THE STARS

WITH ITS ALL-STEEL tripod, this telescope stands almost 4 ft. high. It has two lens, one 90X for high power, the other 45X for wide-angle viewing. The entire family will enjoy looking at the craters of the moon, planets, man-made satellites. Equatorial mount permits tracking the stars without resetting. Reflecting mirror at the bottom of the telescope tube is adjustable to align perfectly with the mirror positioned below the eyepiece mounting. Priced at \$20.00, the "Starmaster" telescope is made by Harmonic Reed Corp., 1111 W. Lancaster Ave., Rosemont, Pa.



"Father is showing how stastics are made."



Large pieces of heavy stock measuring up to 8" can be clamped securely.



Doors or windows can easily be worked upon in either vertical or horizontal position regardless of length.



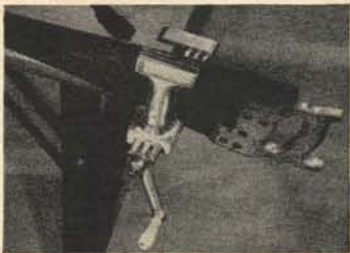
Removable synthetic jaw inserts permit fragile objects to be held without danger of damaging or marring.



Vise in this position allows the working of hexagonal, octagonal, oval or round objects in the desired dimension.

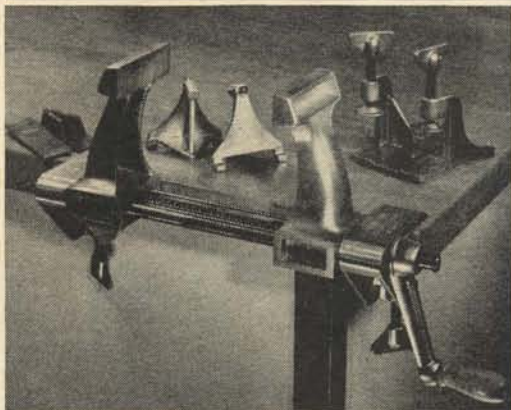


Vise may be inverted to become a powerful "C" Clamp or placed at any angle to hold odd shaped pieces.



5" throat makes it possible for vise to hold all types of saws and other tools for sharpening or repair work.

100-AND-1 USES LITTLE WONDER Portable Vise



The new, lightweight Little Wonder Portable Vise is the most versatile vise on the market today. It can be used as a vise with 8" capacity . . . as a "C" clamp . . . as an extension bar or bench clamp . . . and for holding odd shaped objects. Vise weighs only 8 pounds. Can easily be mounted for either right or left hand operation. Jaws measure 4" x 1 1/4". Vise is built strong enough for professional use, yet designed especially for the home workshop. No matter what the size or shape of the material—wood, metal or synthetic—this precision-made vise can handle it with ease. Order one for your workshop now!

ONLY \$21.90 Postpaid

If Your Dealer Doesn't Stock The Vise . . .

ORDER DIRECT

LITTLE WONDER, INC.

Dept. G • 1028 Street Rd. • Southampton, Pa.

Dealer and Jobber Inquiries Invited

MAIL COUPON TODAY—IMMEDIATE DELIVERY

LITTLE WONDER, INC.

Dept. G
1028 Street Rd. • Southampton, Pa.
Gentlemen:

Enclosed is \$21.90. Please rush me a Little Wonder Portable Vise, postpaid.
(Send check or money order—no C.O.D.'s please)

NAME _____

ADDRESS _____

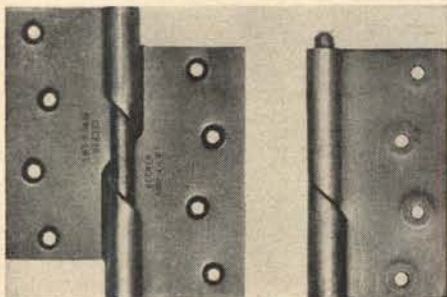
CITY _____ ZONE _____ STATE _____



keeping up with craft and home products

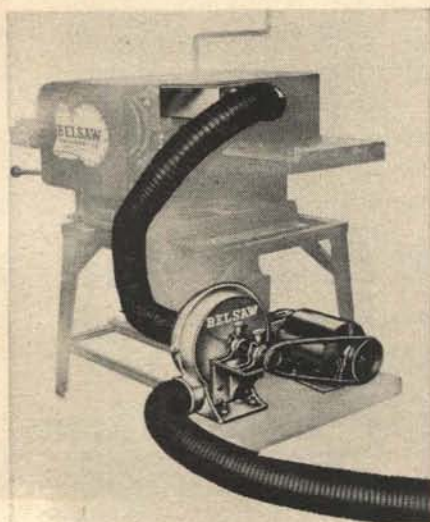
In communicating with companies whose products are described in this department, please mention **WORKBENCH**.

"Lift-Up" Hinges



WHEN A DOOR is fitted with these hinges it raises as it opens, to clear rugs, irregularities in a floor. "Spiral-ramp" design of hinges causes door to close automatically without springs. Door can be positioned to stay open. From \$1.30 to \$1.95, depending on size. Becker Spira-Lift Hinge Co., Inc., 11433 E. Garvey Ave., El Monte, Calif.

Power-Tool Vacuum



ATTACHED DIRECTLY to any woodworking machine, this dust blower can be provided with a flexible hose of any desired length to discharge dust into a container. "Paddle-wheel" fan produces suction for even coarsest shavings. It is portable for general shop cleaning. Unit with collector-hood, flexible hose, fan blower, 1/4 HP electric motor, switch cord, V-belt and pulley is shipped assembled, weighs 45 lbs. \$87.50 from Belsaw Machinery Co., 315 Westport Road, Kansas City 11, Mo.

Septic Tank Reactivator



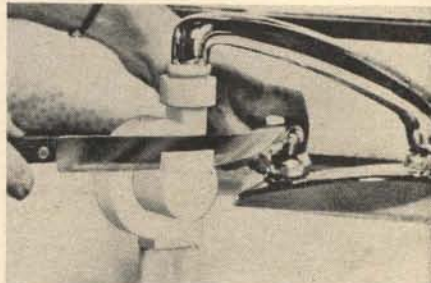
MIX THIS NON-CAUSTIC, non-poisonous dry powder in water, flush down the drain. Bacterial concentrate breaks up solids and grease, prevents overflowing, back-up odors. Guaranteed to reactivate septic tanks and cesspools. Six months supply, \$2.95, Northel Distributors, WM-5, P.O. Box 1103, Minneapolis 40, Minn.

Citizen's Band Portable



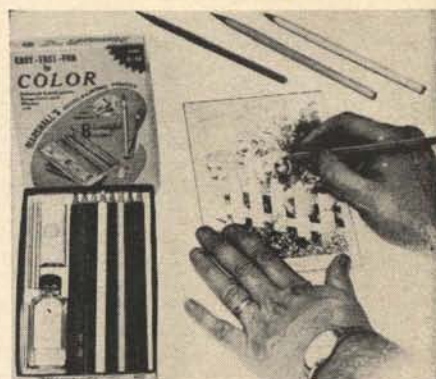
SIMPLE TO USE as a telephone, this "Walkie-Talkie" model of the Citizen's Band Radio has 9 transistors, weighs 18 oz. Depending on terrain and conditions, unit will transmit and receive from 1 1/2 to 7 miles. HE-29 Walkie-Talkie is \$49.50 for one unit, pair is \$96.50. Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, N. Y.

Water-Powered Sharpener



ALL TYPES OF KNIVES, regular, hollow-ground, serrated, etc., are sharpened easily and quickly with this device. An adapter connects it to the kitchen-sink faucet; water pressure powers it. Lifetime lubricated, water-cooled as it sharpens. \$2.98 Aqua-Hone, Dept. AH-1, 2101 N. Lilac Drive, Minneapolis 22, Minn.

Photo-"Painting" Pencils

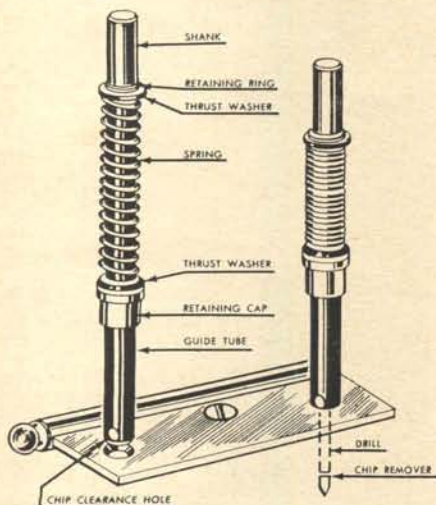


ANYONE CAN COLOR photos, snapshots, and Polaroid prints in just minutes with these special pencils that have sharp points, but the texture of photo oil colors. Colors range from pale green to deep green, from pink to vibrant magenta. Available at camera, art, hobby, drug and stationery stores in Starter Set for \$1.98. Free instruction and information from John G. Marshall Mfg. Co., Inc., 167 N. Ninth St., Brooklyn 11, N. Y.

New Electronics Catalog

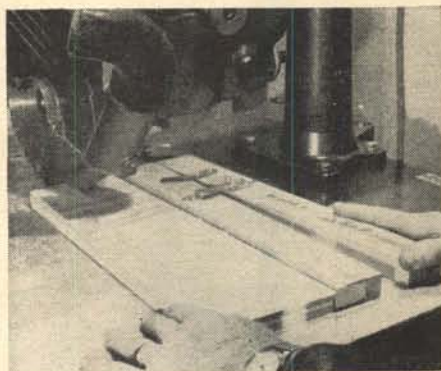
COVERING ITS COMPLETE LINE, a new 4-color, 28-page catalog contains pictures, detailed descriptions, specifications and prices on every item of EICO equipment. Electronic Instrument Co., Inc., 33-00 Northern Blvd., Long Island City 1, N. Y. Free.

Drill-Centering Device



SPRING-LOADED UNIT automatically centers the drill in countersunk holes, as in a hinge leaf. Has 1/4-in. shank, comes in sets of three to suit most commonly used wood-screw sizes. Sets of 3, \$3.95, individual units are \$1.50. For further information: Center Sink Locator, John H. Graham Co., 105 Duane St., New York City.

Adjustable Taper Jig



MAKING TAPER CUTS on a table or radial-arm saw is quick and simple with this adjustable jig. The 15 and 24-in. models were tested in the Model Shop and "worked like a charm." 12-in. model, \$2.95; 15-in., \$3.45; 24-in., \$4.90. Verdan Distributors, Inc., 570 Thomas Ave., Rochester 17, N. Y.

Folder of Hardboard Ideas

COMPLETE LINE of exterior and interior hardboards, in wide variety of surface treatments and thicknesses are presented in color photographs in a folder that also contains sketches of ideas for using materials. Instruction sheets also available. Both from your local lumber dealer or from Silvatek Div., Weyerhaeuser Co., Tacoma, Wash.

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1. Sand with the grain by hand or machine (available for rent at your paint or hardware store) to bare wood. Finish with #2/garnet paper. Sweep clean and dust with damp rag.
2. Brush on with the grain thin sealer coat using one part denatured alcohol and 4 parts pure white shellac (4 pound cut). Let dry 1-3 hours.
3. Rub lightly with fine steel wool or #2/0 paper, wipe again with damp rag and apply second thin coat same as before. (Three hours later, floors can be walked on.)

Paste wax can be used when thoroughly dry if desired.



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Sand lightly just enough to remove dirt and apply two thin coats of shellac as above. Feather your brush strokes to blend easily with old finish. Brushes clean easily in ammonia and water.

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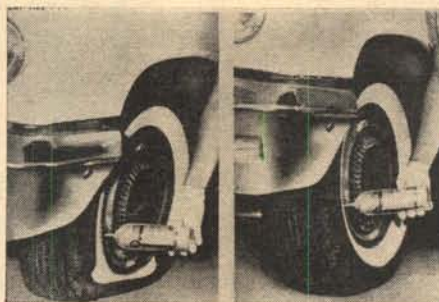
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Craft and Home Products

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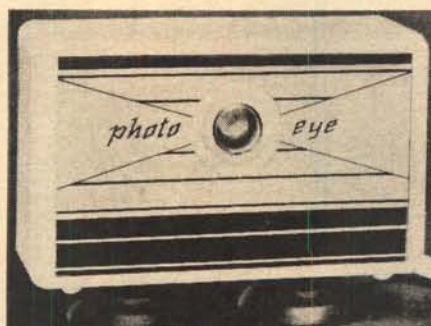
NO JACK, NO TOOLS NEEDED to repair a flat in tube or tubeless tires with this device. Simply connect to tire valve, air and sealant are forced into tire to inflate it and repair leak. Just \$4.95; replacement tanks are \$2.98. From Acme Specialty Co., 140 Halsey St., Newark 2, N. J.

Flower Wheelbarrow



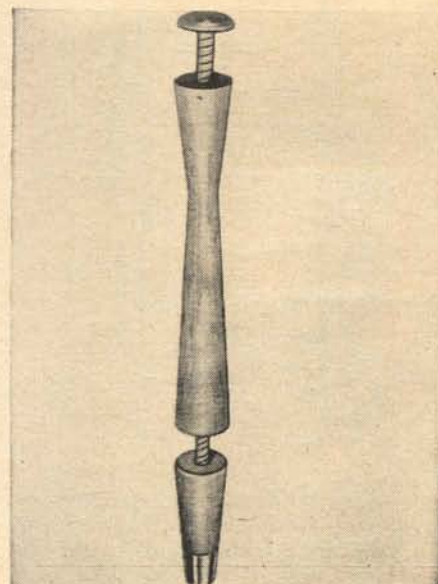
RUGGED ENOUGH TO BE WHEELED around the yard even when filled with pots of flowers, this wheelbarrow is made of stock lumber available at any lumberyard. Full-size patterns, including painting instructions, are \$1.00 from Mastercraft Plans, 7041 N. Olcott Ave., Chicago 31.

"Electric-Eye" Switch



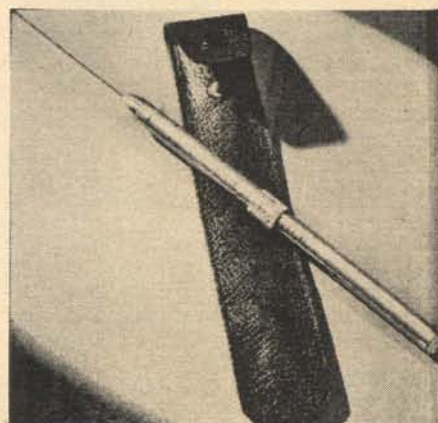
NO INSTALLATION is required for this device that automatically switches on lights at dusk, turns them off at dawn. Light is plugged into Photo Eye, it is plugged into outlet. 30-day, money-back guarantee. \$6.98 ppd., Royal-T Co., Dept. WB-M, 811 Wyandotte, Kansas City, Mo.

"Shelf-Master" Kits



AVAILABLE AS individual units, or in kits, Shelf-Masters consist of 4-in. leg, 14-in. and 10-in. spacers and an end cap. Units permit quick assembly of 3-tier tables and other furniture. For more information, contact Dept. PD, Stanley-Judd, Div. of The Stanley Works, Wallingford, Conn.

Pocket-Size Tachometer



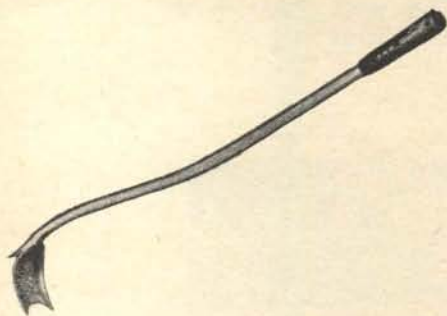
VIBRATION-MEASURING "slide rule" checks r.p.m. from 2,000 to 21,000 whether it's a 2-cycle racing-kart engine or the electric motor of a portable grinder. A must for every kart owner who wants to make sure his mill is peaking at maximum r.p.m.s and for every shop owner who wants to check whether an electric motor is underspeeding or overspeeding. Just \$5.00, complete with case, from Verdell Instrument Sales Co., P. O. Box 212, Burbank, Calif.

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2. Include address label from last issue received or code numbers from address label.
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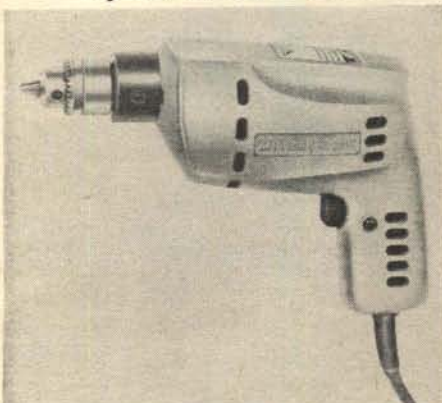
CIRCULATION DEPT. • WORKBENCH
Handcraft Bldg. • Kansas City 11, Mo.

Tool for Gem Hunters



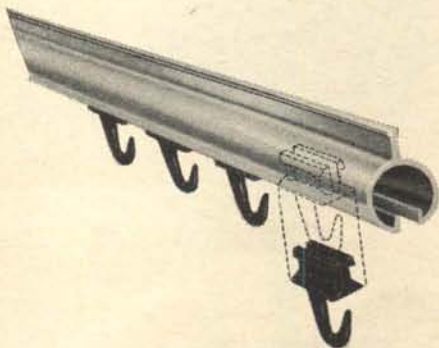
THIS UNUSUAL TOOL is 36 in. long, made of aluminum alloy. It will reach gems in water, under logs, brush or rocks. It rakes, picks up, can be used as cane. Good for climbing rocks; nonslip grip is nylon-vinyl, molded on permanently. \$7.50, Estwing Mfg. Co., Rockford, Ill.

Nylon Electric Drill



INSULATED CHUCK SPINDLE and nylon housing of this new drill motor make it shockproof. Special type nylon is extremely strong, makes drill motor 20 per cent lighter than comparable aluminum units. Motor drives complete line of attachments, many with Quik-Change feature. \$24.95 at Millers Falls Dealers.

Functional Closet Rod

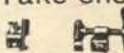
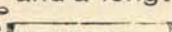





SMART BLACK NYLON carriers glide in gold-anodized aluminum track of this closet pole. Carriers have "snap-in" feature so extra carriers can be added when needed. Write to Grant Pulley and Hardware Corp., High St., West Nyack, N. Y., for more complete data.

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announcing the

DELTA K-2

successor to the Economy Kart
With the progress of karting, the plans for the Economy Kart are now obsolete and will no longer be offered for sale. The DELTA K-2 projects kart design into the future, yet its sheer simplicity makes it a natural for the home builder. Low cost construction.

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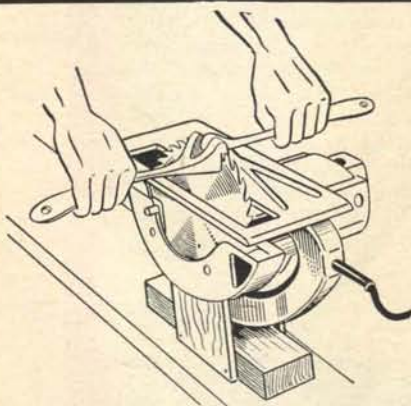
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... and so does kart design!



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Still going strong—DELTA Design Group 1; 3 kart designs, details in color, finest stock, ready for framing—\$1.00. Min-A-Bike Series 2; scale plans for fully sprung kart sized cycle—\$3.00. NOW—ALL THREE—sent ppd. \$5.00! Calif. add 4% Sales Tax.



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This lightweight, aluminum tool fills the need for an on-the-job set. It will set an electric saw (6" or 7" in diameter with $\frac{5}{8}$ " to 1" from point to point) in a matter of minutes. Simple to use. Guaranteed satisfactory or money back. **\$3.00 POST-PAID**

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COMBINATION LATHE-DRILL PRESS from BUILD-IT-YOURSELF KIT

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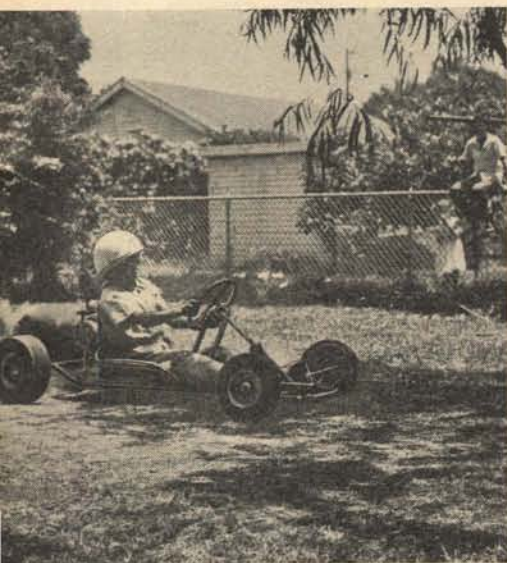
12" swing, 31" between centers, 3-speed Ball-Bearing headstock. Genuine JACOBS $\frac{1}{2}$ " gear-key chuck. KIT (less iron pipe for bed), \$29.95. Also KITS for 10" Circular Saws, 12" & 18" Bandsaws, 6" Belt Sander, Spindle Shaper.

WORKBENCH SPECIAL: Enclose this Ad & 25¢ for any Power Tool Plan, FULL-SIZE Patterns (\$1.00 Value).
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All About Karting



Even young neighbor girl has fun with karting; son Brad takes her for spin around Johnson back yard while Mom, Dad, family and friends watch.



Young Brad wearing crash helmet comes out of fast turn on track set up in the back yard. Karting is excellent training for future drivers.



Commercial artist, Leon Johnson, gives final instruction to a neighbor boy on the driving of his Simplex kart. Several families on outing in park shared in fun of driving the sporty vehicle.

(Go Kart is not a generic term, but the registered trademark of the Go Kart Mfg. Co., Azusa, Calif.)

AS AMERICAN AS ICE CREAM, jazz and square dancing, karting is such a new sport that the first vehicle recognized as a genuine kart was not built until 1957. About as basic a vehicle as ever conceived, it consisted of a frame, wheels and engine, seat for the driver and a means of steering. Just a few months after the construction of the first kart, the Go Kart Club of America was formed, and their regulations require that karts maintain this basic con-

struction. A body on the vehicle would be too small to permit an adult to drive it. Elimination of springs or any sort of suspension also is a cost and weight-saving factor. Safety and low cost, these are the features that have made karting a sport for the whole family, including Mom and Sis.

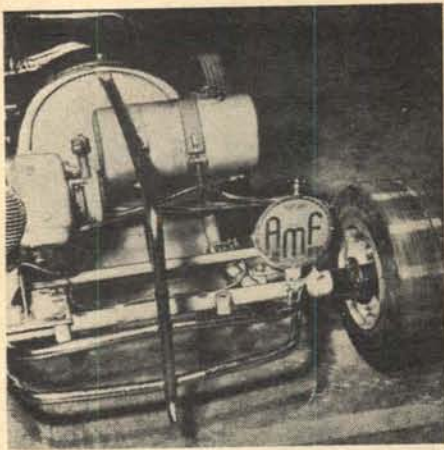
What is the great appeal in karting that has made it the fastest growing sport in history? We Americans love cars and speed. Few of us can



Being female is no handicap in the sport of karting. The girls can drive the vehicles, or crank up the engine, the same as the boys. Brother stands by, just in case a little male know-how is required.

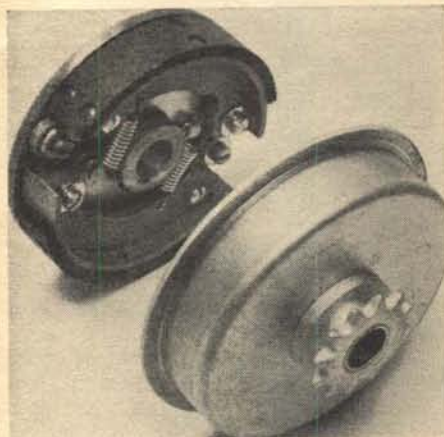


Dad can corner with the best. Here he sprays dirt as he swings around the 50-ft. track he marked out in the back yard. Nice neighbors are a help.

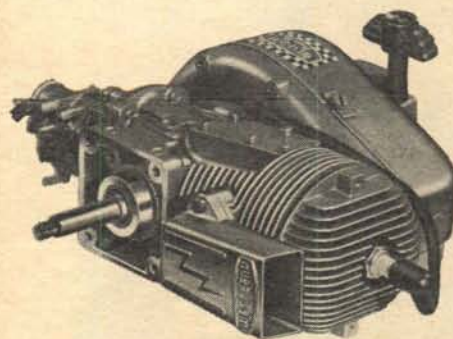


Fitted on conventional live axle, Sur-Tork differential lets outside wheel rotate faster than inside wheel on turn, locks up for fast getaway.

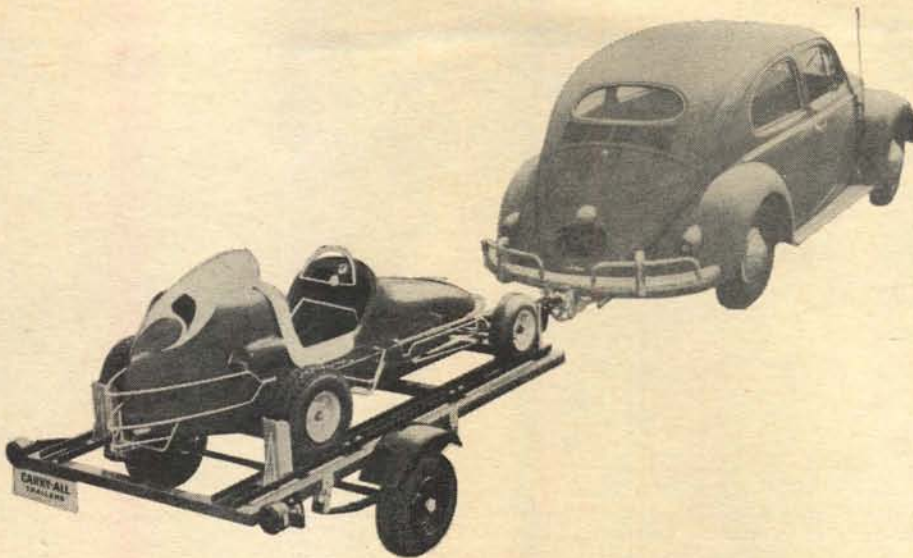
afford to own and drive a race car. Even fewer know how to work on one. Almost anyone can afford to buy a kart, and with its mechanics reduced to absolute basics in a one-cylinder engine, you need not be a master mechanic to work on and tune it. A kart is an adult-sized car that youngsters can drive. Its speed can be set to match the age of the



Variety of brakes are available for karts. Drum and shoe combination by Azusa Engineering looks remarkably like unit from automobile.



Standard power plants for all karts is one-cylinder two-cycle engine that turns astounding number of r.p.m.s. This unit is made by West Bend Aluminum specifically for karts. "Hop-up" components are available for all kart engines.



If you have a small car, or trunk is not big enough to handle kart, special trailers are available. This Carry-All unit is shown carrying 1/4-midget.

driver. Driving a kart at 25 or 30 m.p.h., with the track just an inch or two below you, gives you the feeling of driving 60 to 80 m.p.h. in a passenger car. With their low center of gravity, they are extremely difficult to upset and very few kart drivers have ever been injured.

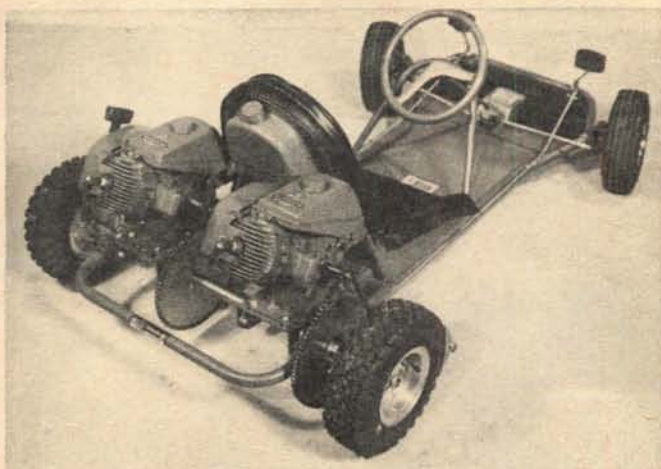
It's a do-it-yourself sport. You can buy components; wheels, engines, clutches, brakes, ball joints and even frames are available in kit form ready to be welded. While working on a kart Dad can teach the principles of an internal-combustion engine to his children, as well as the mechanics involved in the building, maintenance and repair of a motor vehicle. Driving a kart provides invaluable experience for future automobile drivers. Every driving problem—skids, spins, braking, accelerating, avoiding collisions — is

present in kart driving. A good kart driver will make a good automobile driver, because in his kart racing he will frequently be involved in situations that call for quick thinking and immediate decisions. The average passenger-car driver only infrequently is caught in a situation that calls for quick thinking and skillful driving; too often he makes the wrong decision.

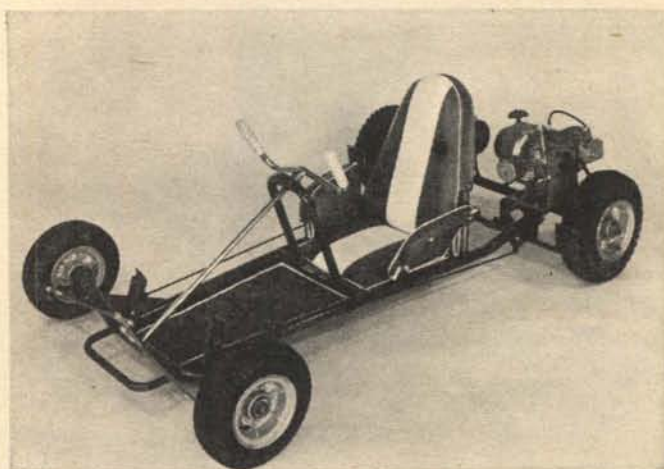
One point should be made very clear, karts are not to be driven on streets or highways. The Go Kart Club of America lists it as a regulation, every manufacturer makes that statement in his catalogs, every true kart enthusiast insists that karts be driven only on tracks built for them, on parking lots when permission is granted, or on any off-street facility that is available. But never, never on roads used by trucks and pas-



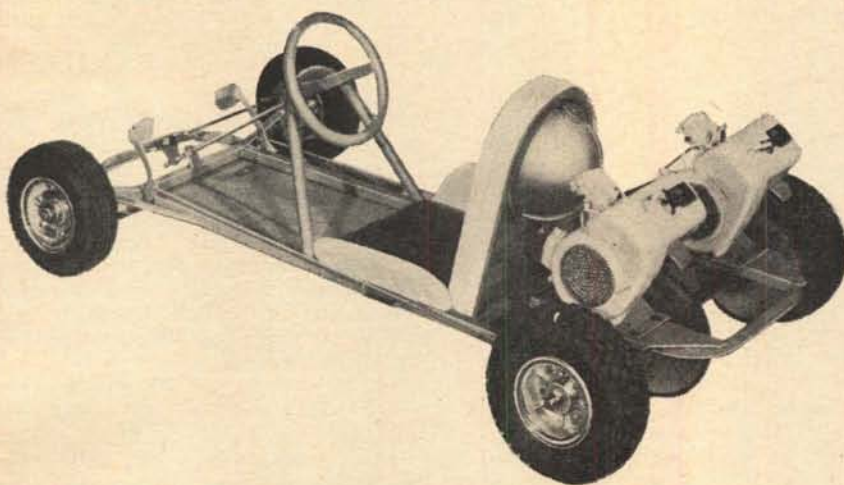
Details of kart construction vary, but all basically are starkly utilitarian with just frame, wheels, motor, seat and method of steering. Zip-Kart is by B and H Machining, Inc.



This kart manufactured by 500 Industries is potent Class C machine powered by two Clinton engines. Unit with this much power requires a driver with considerable experience; acceleration is fantastic.



Popular handlebars, rather than steering wheel, is used on this sharp vehicle made by Scat Cat. Single, low-cost engine places this kart in Class A category; class where beginners start to learn.



This Class C kart is made by Standun Industries. Two McCulloch engines power this hot vehicle, called the "Javelin." Note tank on seat back.

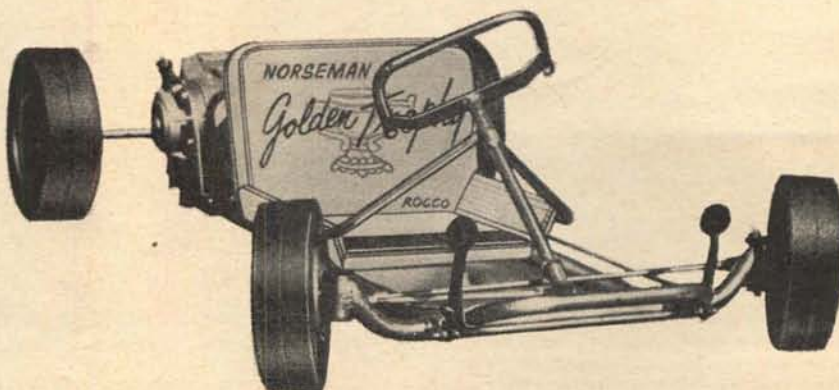
senger cars. Karts simply are too small to be seen and cannot be made safe to drive on streets by adding horns, lights, etc.

Karts are small enough to be driven in a back yard, as is the case with Mr. Johnson, his family and friends as shown in the first five photos, but karts are noisy and we could not recommend this to everyone. The answer, in most cases, is to build a track designed especially for the running of karts. Clubs can be formed, and the cost of such a track can be split up among the members. There are tracks in many cities that are open for the use of kart owners who have no other place to run their vehicles. The usual charge is so much per lap, or per time. These tracks also have karts that can be rented. If you want to learn the reason so many people

have become avid karting enthusiasts, take a spin on a rented kart. Generally such karts have well-behaved 4-cycle engines and a smooth-acting clutch. But the thrill is there and you can quickly tell why there is so much fun in the sport. We checked out in a kart at Thrillkart Stadium, just south of Kansas City. Our cover is a shot of the action at that track. To get the look and feel of all-out competition kart racing we

went to Olympic Stadium in Kansas City. It's a rough-and-tumble sport, but there were few injuries. It's as exciting as big-car racing, and you know you can enter the races for the cost of a kart and the entry fee.

Write to the various manufacturers, look over their products, decide whether you want to build or buy. Mom and Sis will want to drive the kart too, so better have them in on the conference. △ △



"Half-square" steering wheel is used on this kart made by Rocco. The vehicle shown has racing slicks all around; used on paved tracks.

THE WORKBENCH KART

LEO McFARLAND



1. Not built for racing, the WORKBENCH kart is right at home on a back lawn, a driveway or patio. This kart, as well as all others, is not to be driven on street or highway under any circumstances.

DESIGNED AS A "BACK YARD" FUN CAR to introduce you to the sport of karting, the WORKBENCH Kart has a frame of black-iron water pipe, rather than the chrome-molybdenum or other high-strength steel tubing required for racing vehicles. Also, while racing karts have high-revving 2-cycle engines (10,000 r.p.m. and more), our kart used a more docile 4-cycle engine of 3 to 4 H.P. A centrifugal clutch (on the motor shaft in Figs. 1 and 2) is included in our design to permit starting the engine with

the kart standing still. Most racing karts do not have clutches.

In Figs. 1, 2 and 3 you will note that the kart has only a hand lever to actuate the brake. In Figs. 5, 6 and 8 there is a brake pedal that actually operates the brake, although the hand lever has been retained. This was done to show the relative position of the lever in the event that you wanted it rather than the foot pedal. The lever does provide greater leverage and is recommended for younger drivers.

Start construction, Fig. 4, by cutting the frame rails and axles from pipe. Non-galvanized black pipe is less expensive, and welding it will not produce the irritating zinc fumes that result when galvanizing is burned. The ends of the frame members can be notched or a radius ground in them for a better fit against the axles. The loops that form the seat back and steering-column support are shaped from $\frac{1}{2}$ -in. pipe with the aid of a tubing bender. The yokes on the ends of



2. Head-on view shows simplicity of construction. Note automatic clutch on motor shaft, V-belt to wheel pulley. This model has hand brake.



3. View from right rear quarter shows outline of floor pan, how rear lip of pan is welded to seat back. Clearly detailed is method of running long choke cable from accelerator pedal, along frame and rear axle and up to carburetor. Cable is well supported, all bends in it are held to gentle curves.

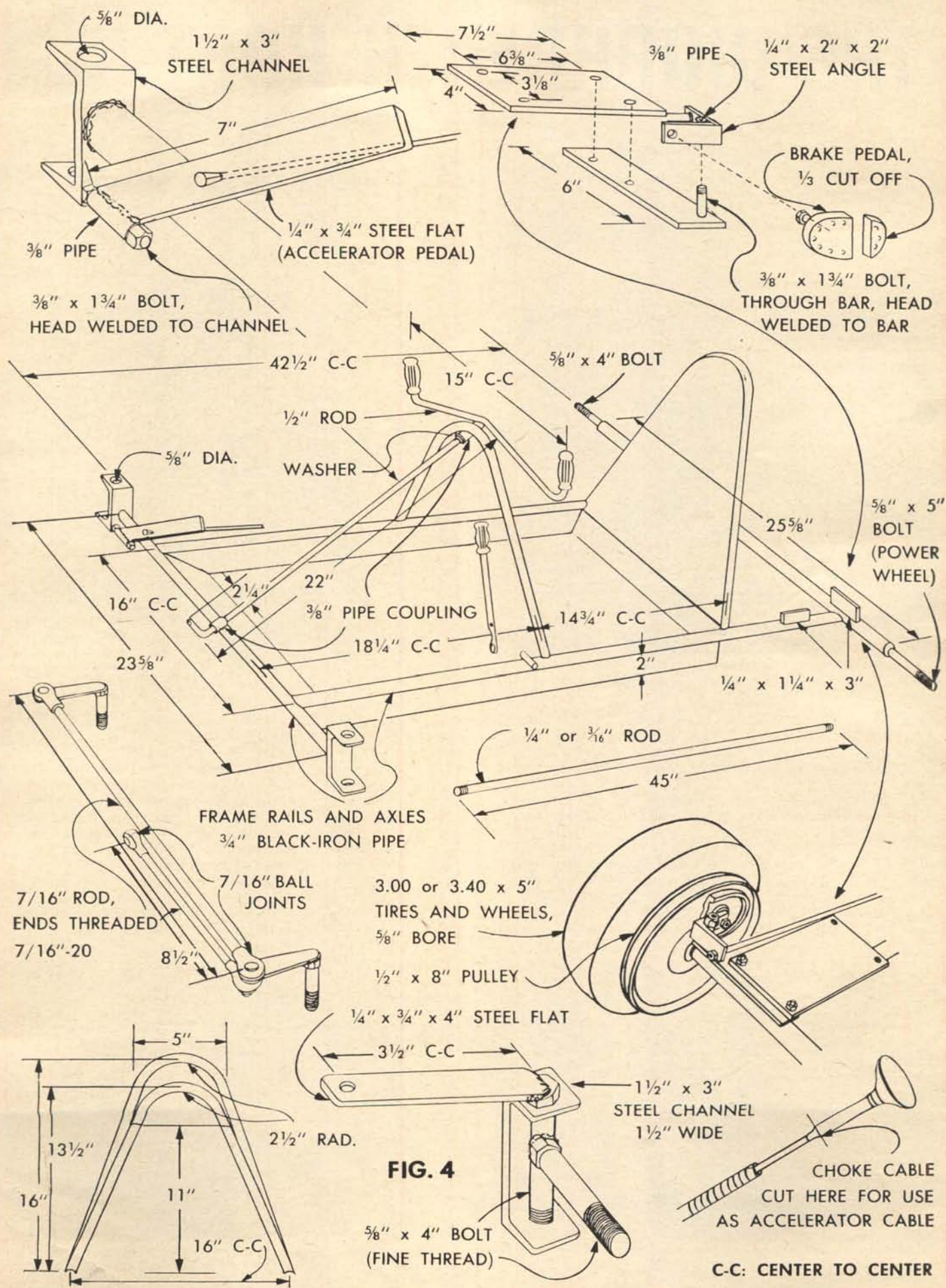
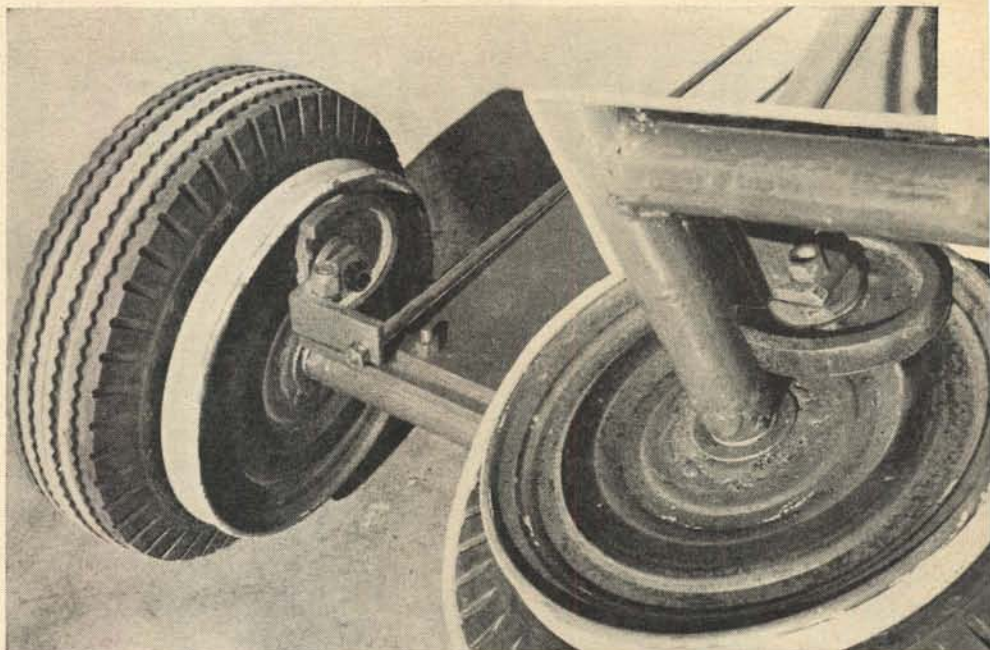


FIG. 4

the front axles are slices cut from channel. Have these cut at the steel-supply house or salvage yard where you buy the metal. The yokes also can be bent from $\frac{1}{4}$ x $1\frac{1}{2}$ -in. steel flat. They will not be as strong as the channel, but will be adequate for youngsters. If you have your own equipment, weld the kart as you go along. If the welding is to be done at a local shop, it is best to cut and fit all pieces first.

The steering "wheel" and column are cut from $\frac{1}{2}$ -in. steel rod. The column is supported in $\frac{3}{8}$ -in. pipe couplings that are reamed with a $\frac{1}{2}$ -in. drill bit to provide a sliding fit. Just below the top coupling weld a $\frac{1}{2}$ -in. washer to the column to prevent it from being pulled up. The sheet-steel floor pan, Figs. 4 and 7, is 18-ga. metal. A couple of 2 x 4s and some clamps can be used to improvise a brake for bending the flanges on the pan, or the job can be done at a sheet-metal shop. The bottom of the pan measures 16 x 30 in., while the top is 3 in. longer, to provide a slanting "toeboard."

Extensions can be welded to the tops of the kingpin bolts before fitting them in the yokes, but the axles are welded on afterward, Figs. 4



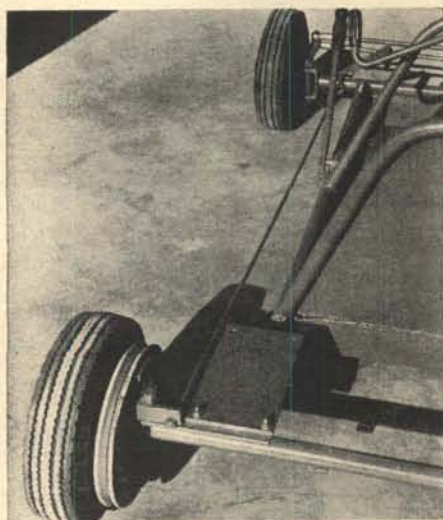
5. Left rear wheel is driving wheel, also is braking wheel. Pad of brake pedal from car is forced against face of pulley to provide quick stopping action. Lower photo is close-up of brake pad, also shows how motor platform is welded solidly to supports on frame and on the rear axle.

and 8. The accelerator cable is an automobile choke cable, cut as indicated in Fig. 4. The cable is pulled from the housing, fitted through a hole in the accelerator pedal, then replaced in the housing. Cable and housing are held in short lengths of $\frac{3}{8}$ -in. pipe, Fig. 7, welded to the frame. A 6-ft. cable was used on the original car; your car might use a shorter one, depending on motor de-

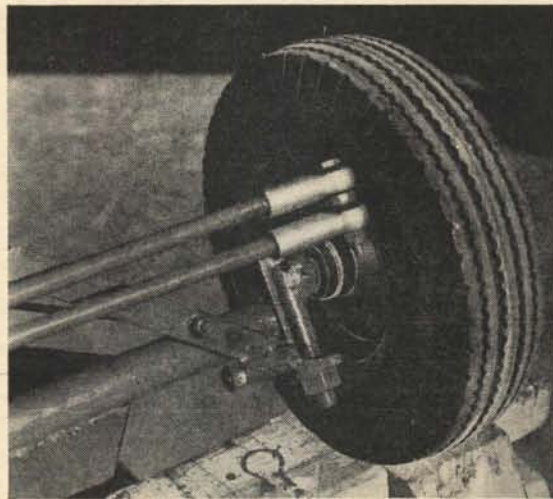
sign and other factors. The brake "shoe" on the original was the modified foot pedal from an early-model car. It is fitted in a pivoting angle that forces it against the drive pulley, Fig. 5, when the brake is operated.

Ball joints for the drag link and tie rod can be purchased at kart-supply and mail-order houses, as can the tires, wheels, clutches and other components. Spacing of the holes in the motor mount may have to be changed to accommodate a particular motor.

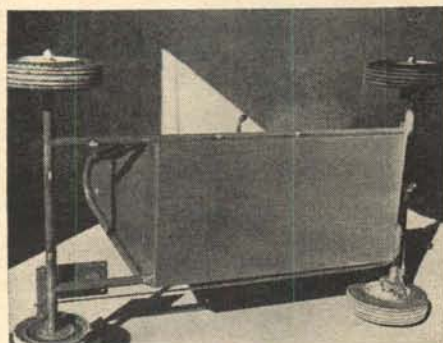
When you finish the kart and fire up the engine, your only problem will be whether Dad or Son gets the first chance to drive it. $\Delta \Delta$



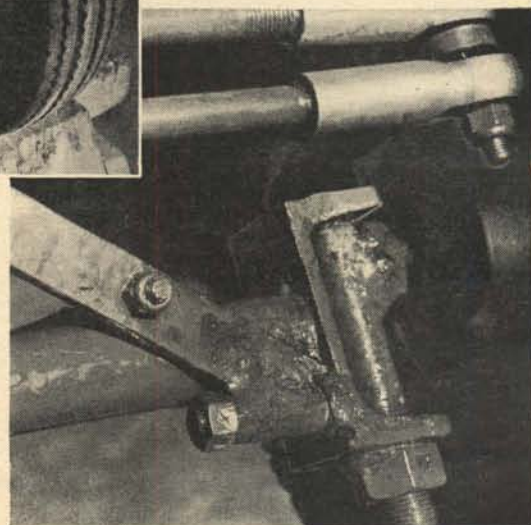
6. Solid rod runs from brake pedal at left front of kart to lever pivoting on bolt welded to rear axle. Kart also has hand lever for brake.



8. This photo of left end of front axle shows brake pedal, spindle support, tie rods and drag link. In close-up is detailed method of pivoting brake pedal on bolt welded to inside surface of channel that provides axle yoke. Note that nut on spindle bolt is tack-welded to bottom of yoke.



7. Shot of bottom of kart shows one-piece floor pan, and how it is welded to underside of longitudinal frame members. Short lengths of pipe support accelerator cable.



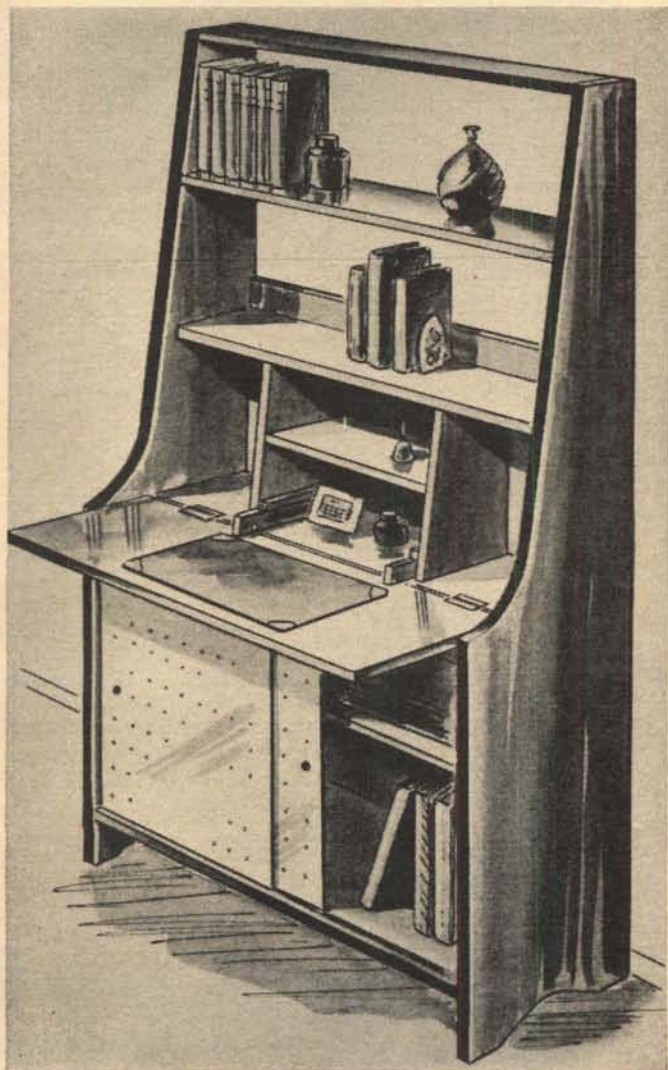
MODERN PINE SECRETARY

ROBERTA FAIRALL

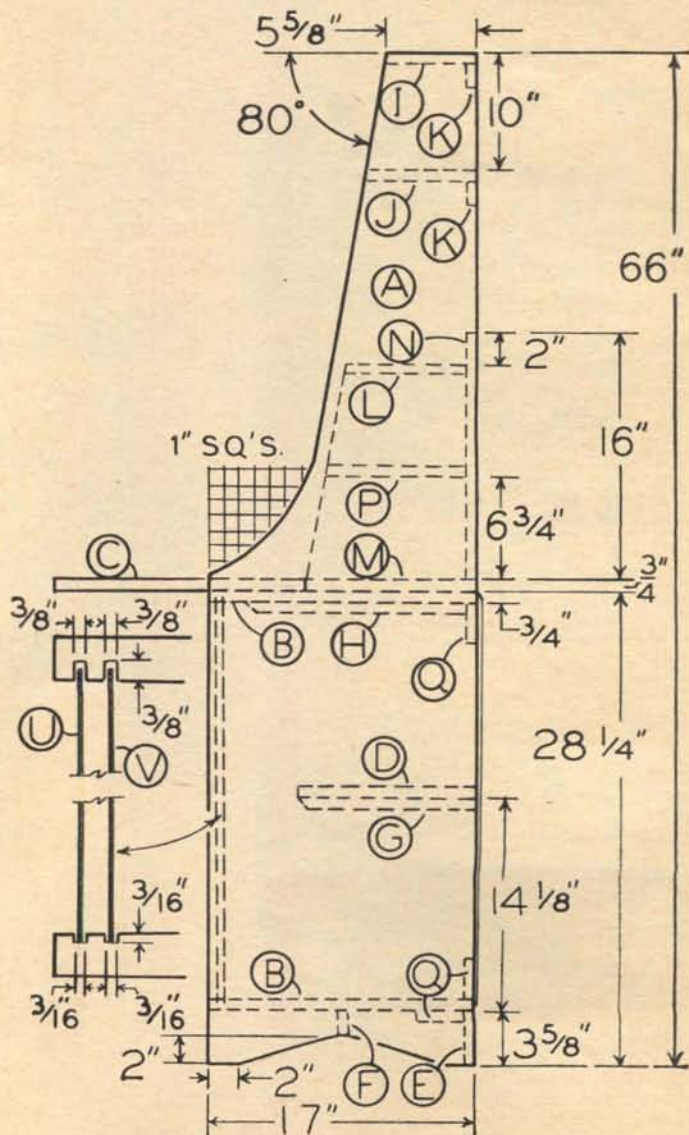
MATERIAL LIST

PLYWOOD, $\frac{3}{4}$ in., A-A (Good both sides)

- A—Sides, 17" x 66", 2 req'd.
- B—Top and Bottom, 17" x 40", 2 req'd.
- C—Drop Leaf, 15½" x 40", 1 req'd.
- D—Cabinet Shelf, 11½" x 40", 1 req'd.
- E—Back Apron, 3⅝" x 40", 1 req'd.
- F—Stretcher, 1⅝" x 40", 1 req'd.
- G—Cabinet-Shelf Cleats, $\frac{3}{4}$ " x 11½", 2 req'd.
- H—Cleats, Cabinet Top, $\frac{3}{4}$ " x 14", 2 req'd.
- I—Top of Secretary, 5⅝" x 40", 1 req'd.
- J—Shelf, 7½" x 40", 1 req'd.
- K—Shelf and Top Cleats, 1⅝" x 40", 2 req'd.
- L—Top of Desk, 8¼" x 40", 1 req'd.
- M—Bottom of Desk, 11¼" x 40", 1 req'd.



Flat, off-white enamel is used on the doors, brown stain on the plywood, raw edges are painted with brown enamel.



N—Back of Desk, 16" x 40", 1 req'd.
O—Partitions, 11¼" x 13¼", 2 req'd.
P—Shelf Between Partitions, 9½" x 20", 2 req'd.

SOLID STOCK, 1 IN.

Q—Corner Glue Blocks, 3½" x 3½", 6 req'd.

R—Locking Bars, 1½" x 9", 2 req'd.

S—Cleats Above Bars, ¾" x 10½", 2 req'd.

HARDBOARD, ½", SOLID OR PERFORATED, AS INDICATED

T—Cabinet Backing, 24" x 41", 1 req'd.

U—Left Door, 20" x 23½", 1 req'd.

V—Right Door, 21" x 23½", 1 req'd.

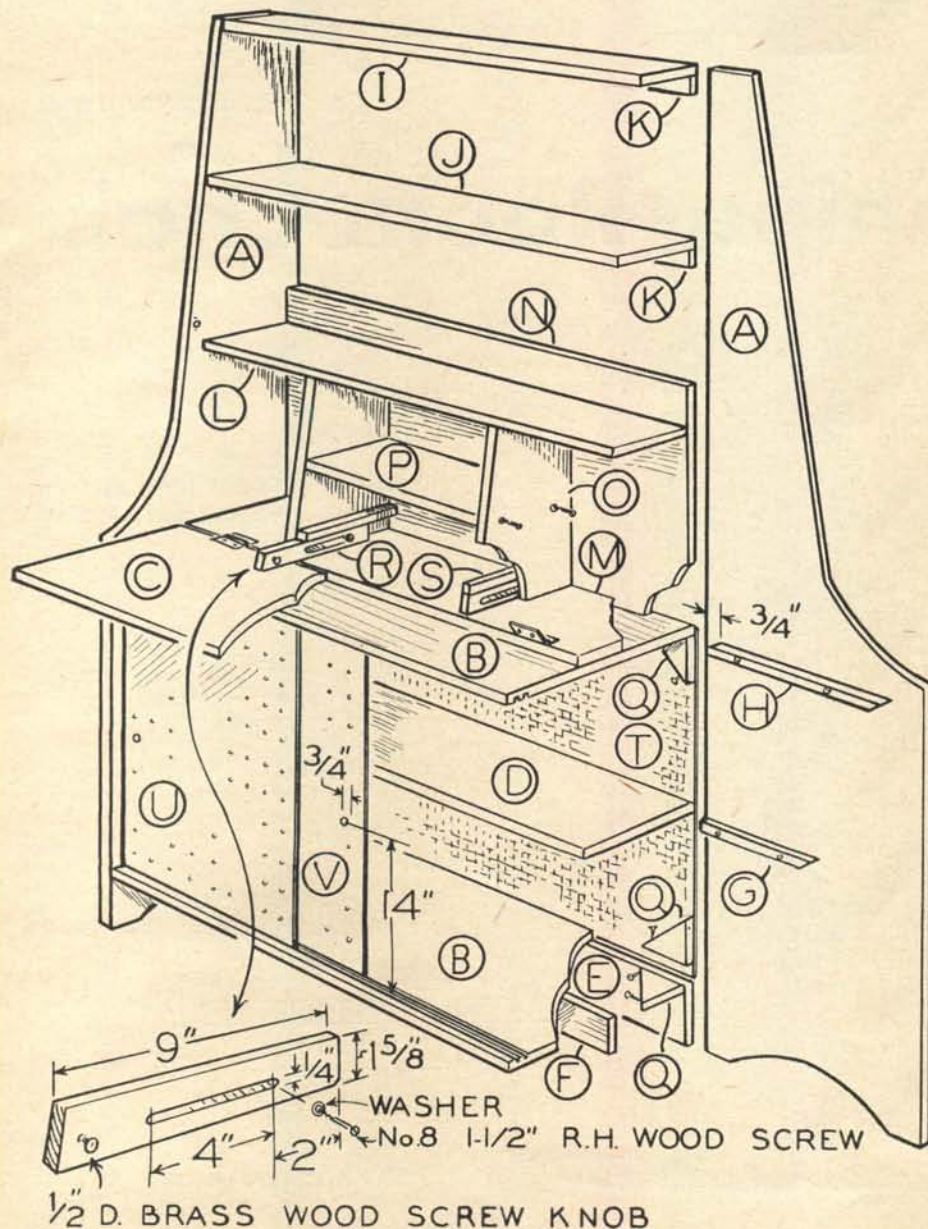
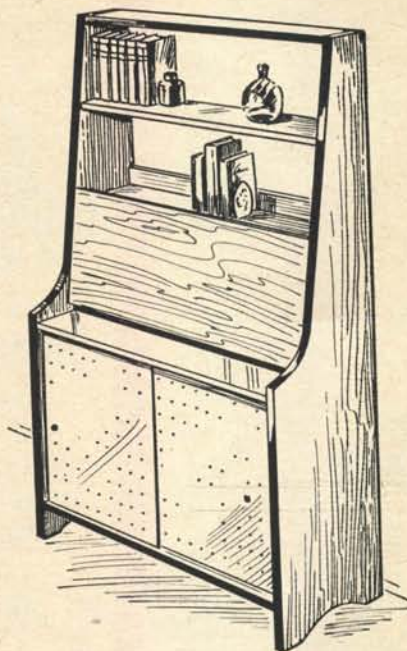
MISCELLANEOUS

1" x 1½" Cabinet Butt Hinges, 2 req'd.

1" Dia. Brass Knobs, 2 req'd.

Bullet-Type Door Catch, 1 req'd.

Wood Screws, Nails, Wood Filler, Glue, etc. △ △



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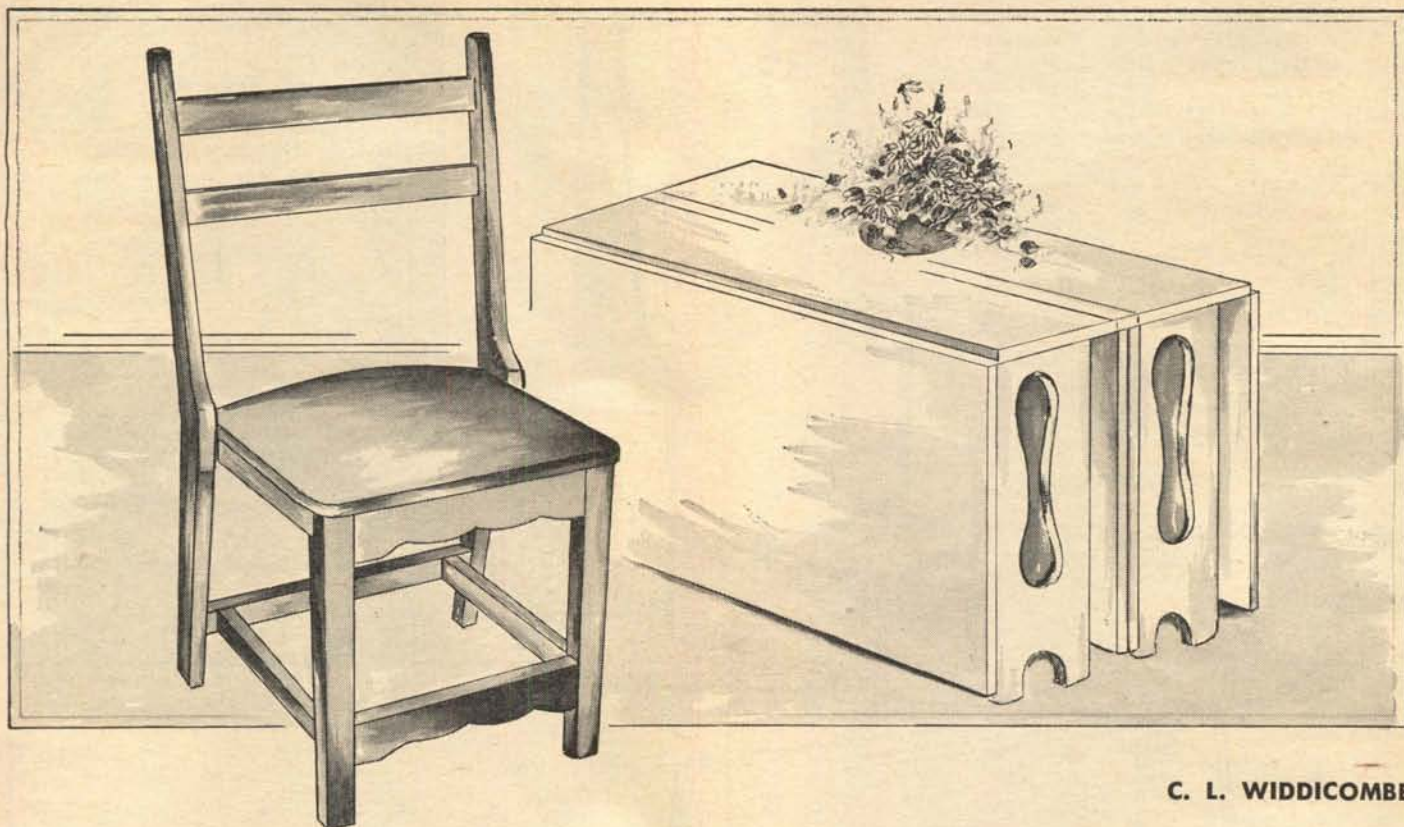


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C. L. WIDDICOMBE

Folding Dining-Room Chair

IN RESPONSE TO MANY REQUESTS we are here presenting the construction of a folding chair to be used with the Expandable Table published in our

Sept.-Oct., 1960, issue. Two of these chairs can be left at the table when it is folded to its smallest size, and extra chairs can be stored in a

closet, basement or attic. In a future issue we will present an article showing how to build a "buffet-type" storage cabinet that will hold four

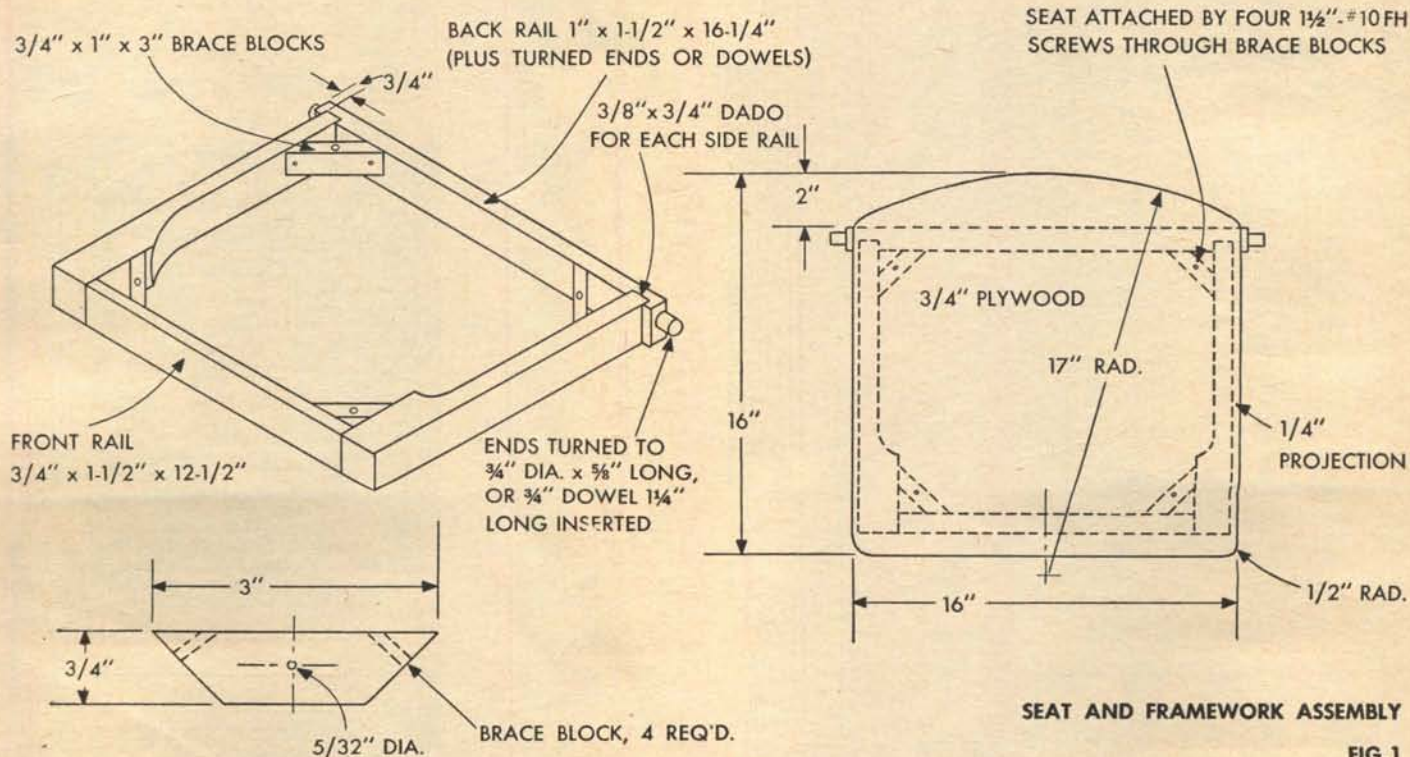


FIG. 1

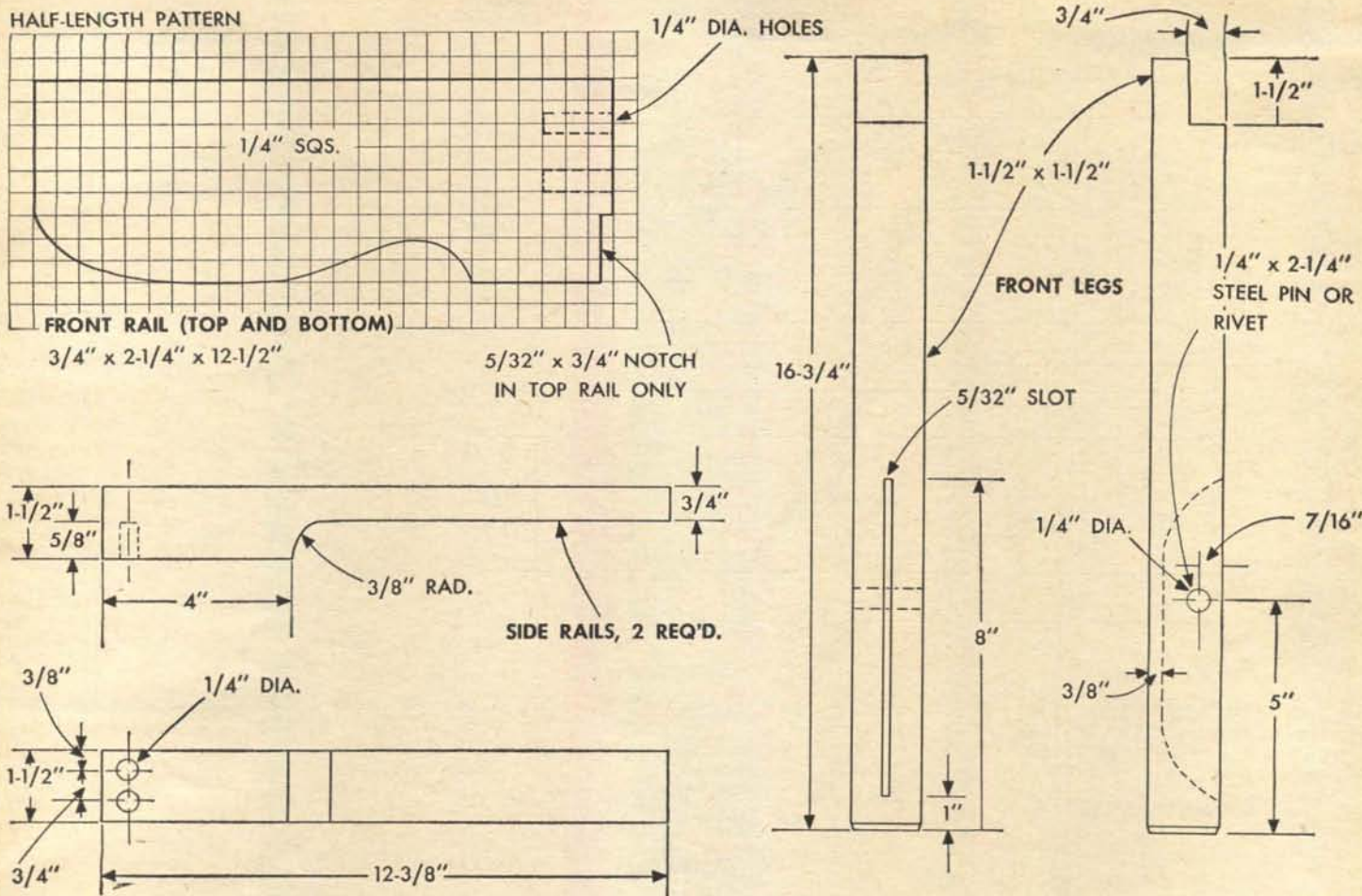


FIG. 2

of the chairs, as well as providing space for table linens and the like. Even if you did not build the expandable table, a few extra chairs can be used in most homes and these chairs have the appearance of solid, nonfolding furniture.

Except for the seat of the chair, hardwood stock of your choice can be used for all parts. If you have the table, the chairs should, of course, be of the same wood. Hardwood-faced plywood also can be used, as was the case with the table, except for the two front legs.

The only unusual hardware required are the two folding-leg brackets. These can be obtained from one of our advertisers that sell hardware and material for furniture building. Hand tools can be used in the construction of the chairs, although the two long back legs can be done more quickly with a band saw or jig saw. We suggest you check with friends to see if they have a band saw you could use, or perhaps your lumber dealer can cut them. If you do not have access to a wood-turning lathe, use lengths of 3/4-in. dowel fitted in holes bored in the ends of the seat-frame back rail and the lower rung, in place of the suggested turnings on the ends of these pieces. One other operation that will require the use of a power tool, unless you are quite expert with hand tools, is cutting the slots in the front

legs to receive the flat-steel locks. These slots should be a snug fit on the locks, so there is no looseness when the chair is set up. If the pins and locks are correctly positioned, the ends of the bottom crosspieces

will butt tightly against the front legs, and add additional rigidity.

Chairs can be finished and used without upholstery, but they will look and "sit" better with a piece of foam rubber or urethane foam fitted on



3. Front view of folding chair shows its attractive design. Seat is not upholstered (we strongly recommend upholstery) and chair is not finished.



4. View of back of chair demonstrates how lower leg locks show only slightly. Locking bracket can be seen at top, left leg.

BOTTOM LOCKRAIL ASSEMBLY

1/8" x 1" STEEL FLAT, 2 REQ'D.

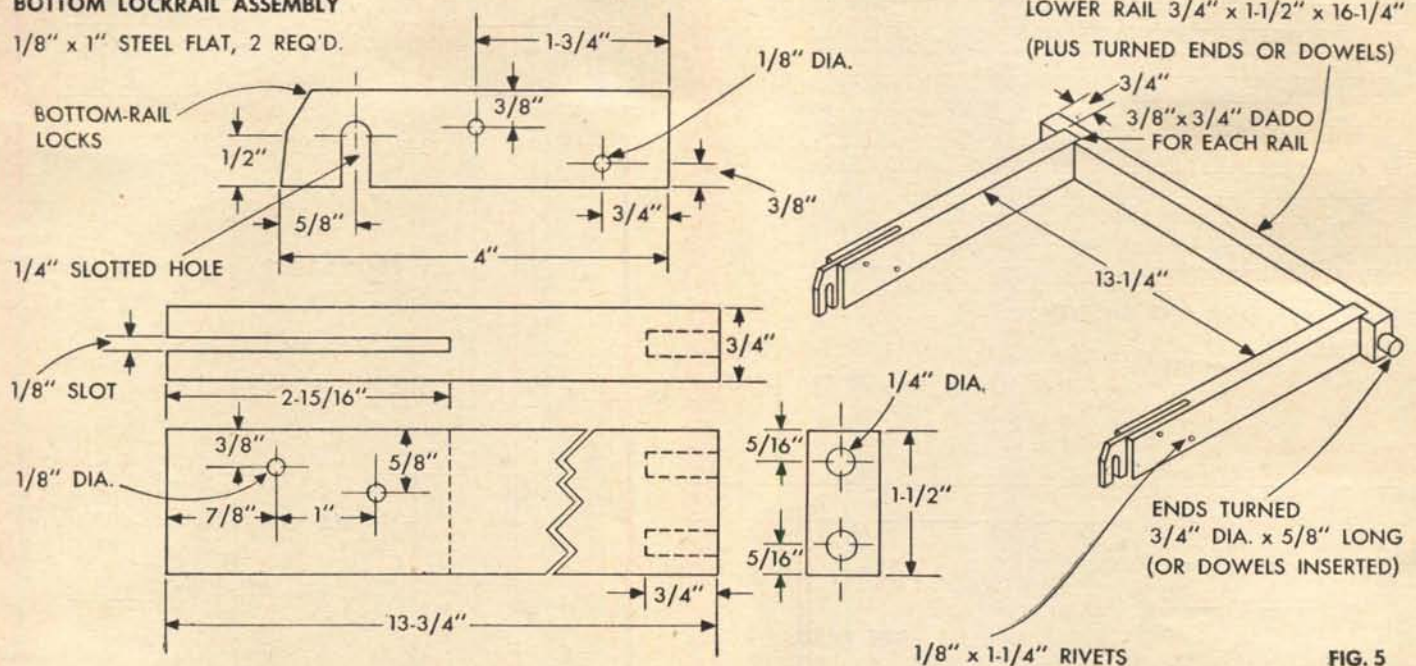


FIG. 5

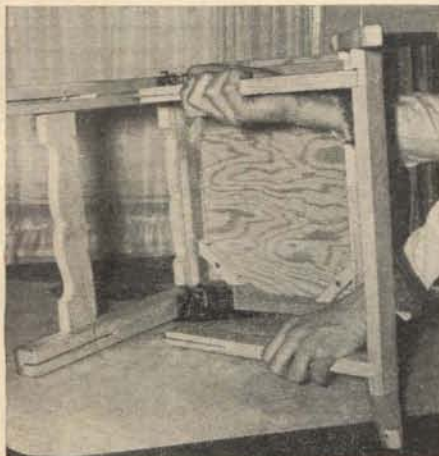
the seat. Upholstery material then can be pulled over the padding and stapled to the bottom of seat. Δ Δ

MATERIALS LIST

1" Solid Stock or 3/4-in. plywood

SEAT FRAMEWORK

Back Rail, 1 1/2" x 17 1/2", 1 req'd.
(Solid stock suggested, because of required dowels or end turnings)
Front Rail, 1 1/2" x 12 1/2", 1 req'd.
Side Rails, 1 1/2" x 1 1/2" x 12 3/8", 2 req'd. (Can be glued up from 3/4" Plywood)
Corner-Brace Blocks, 1" x 3", 4 req'd.
Front Legs, 1 1/2" x 1 1/2" x 16 3/4", 2 req'd. (Must be solid stock)
Top and Bottom Front Rail, 2 1/4" x 12 1/2", 1 each req'd.
Bottom Lock Rail, 1 1/2" x 13 3/4", 2 req'd.
Seat, 16" x 16", 1 req'd.



6. Despite its solid appearance, chair folds quite compactly for storage, is easily carried in folded condition. Note graceful back leg.

Lower Back Rail, 1 1/2" x 16 1/4", 1 req'd.
(If turnings made, add 1 1/4" to 16 1/4" length)
Back Leg Blanks, 4" x 36", 2 req'd.
Back Rests, 1 1/2" x 16 1/4", 2 req'd.

HARDWARE

RH Brass Wood Screws, 1 1/2"-#10, 4 req'd.
RH Brass Wood Screws, 1 3/4"-#10, 4 req'd.
Stainless-Steel Locking Pins, 1/4" Dia. x 1 1/2", 2 req'd.
Steel Rivets, 1/8" x 1", 4 req'd.
Washers, 1/8" Dia., 8 req'd.
Washers, 1/4" Dia., 4 req'd.
(Washers should be stainless steel, or chrome-plated)



7. Demonstrated here is the way bottom-rail locks slip into front legs. Careful fitting of locks and slots in legs will assure rigidity.

Flat-Steel Locks, 1/8" x 1" x 4", 2 req'd.
Folding-Leg Locking Bracket, 2 req'd.

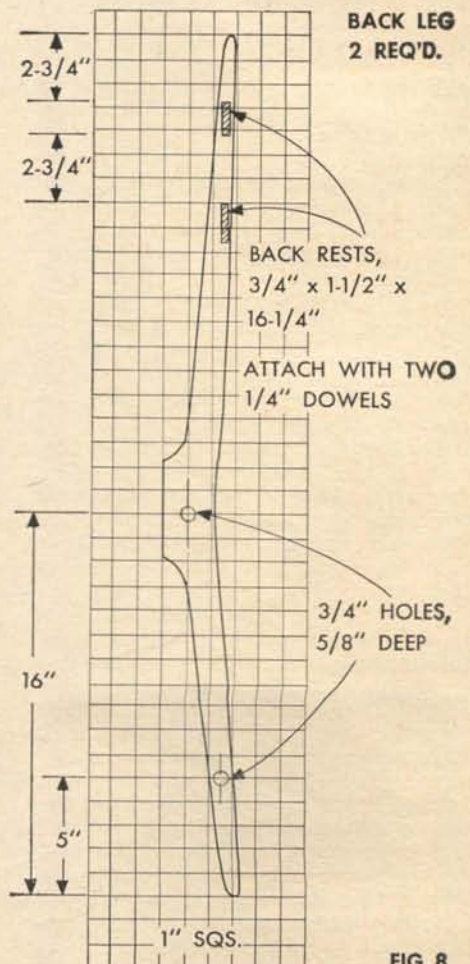


FIG. 8



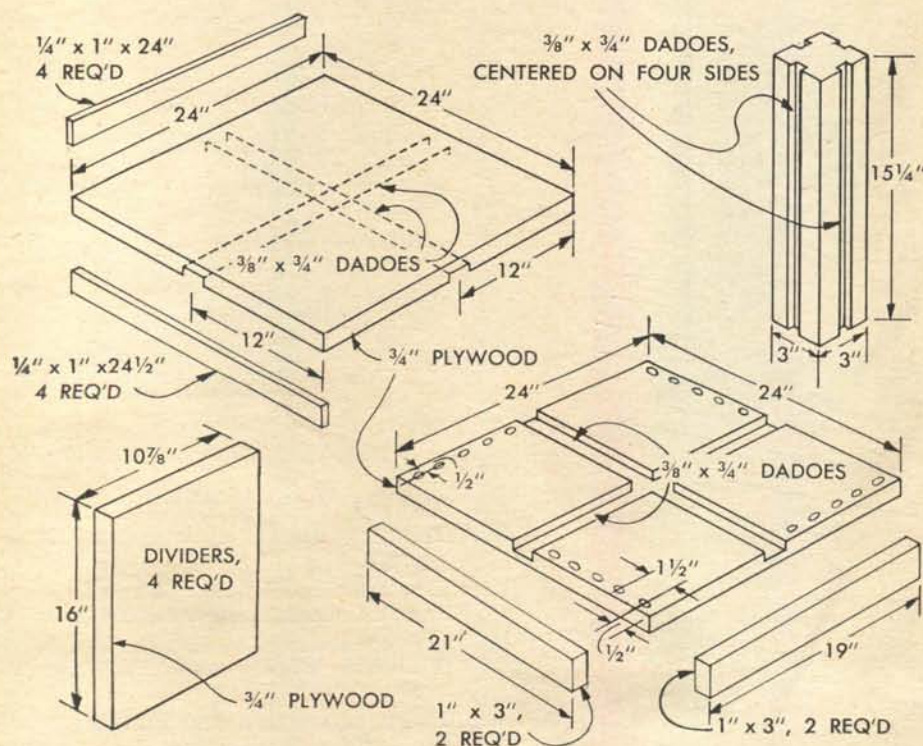
Unusual in design, but simple to construct, this table requires only the use of a table or radial-arm saw to cut the dados in the top and bottom and on the center post. Trim strips are painted a contrasting color.

Laced Table

GENE R. CANNADY

TOP AND BOTTOM of this table are 24-in. squares of $\frac{3}{4}$ -in. plywood. Dados cut across the centers of the squares in each direction accept the edges of the plywood dividers. The center post is dadoed to accept the vertical edges of the dividers. A 3-in.-square post is shown; if a 4 x 4 is used (approx. $3\frac{3}{4}$ x $3\frac{3}{4}$ in.) the dividers must be made narrower to suit. Holes for the lacing $\frac{1}{4}$ in. in diameter are drilled in the bottom on a line $\frac{1}{2}$ in. from the edge. Holes are drilled into the edge of the bottom

so finishing nails bisect the holes. Trim strips cover the nails, and also hide the ends of the dados. Strips of $\frac{1}{4}$ -in. stock are used to cover the edges of the dividers to hide the end grain. Plastic cord, available at hobby shops, is run from screweyes located on the underside of the top exactly between the holes in the bottom, down to the holes and around the nails, then back to the screweyes. About 24 yds. of cord are required. A support base of 1 x 3s can be used, or casters can be utilized. $\triangle \triangle$



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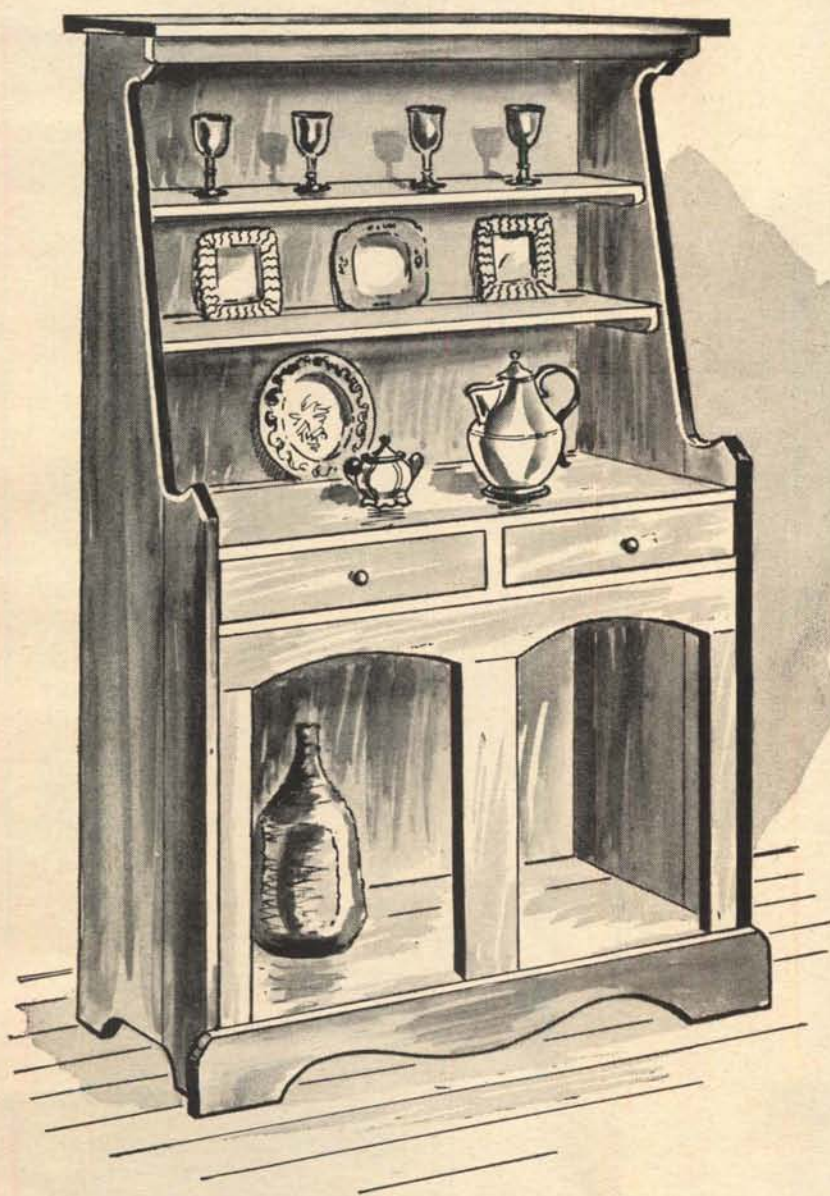
Name

Address

City Zone State

Early-American Pewter Cupboard

(Smaller version of an antique English dresser that originally had its place in the kitchen.)



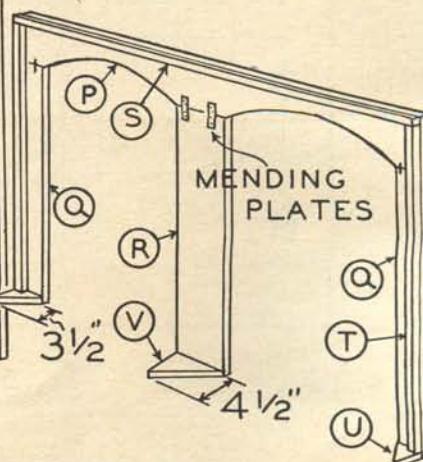
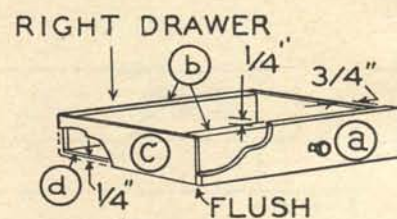
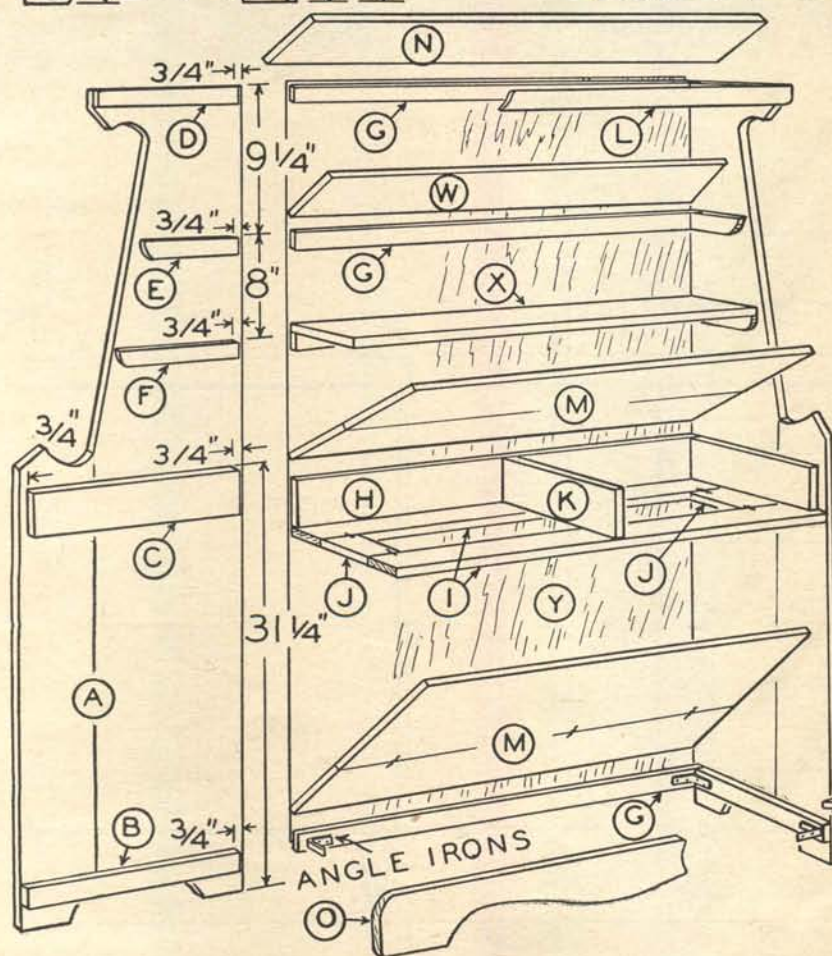
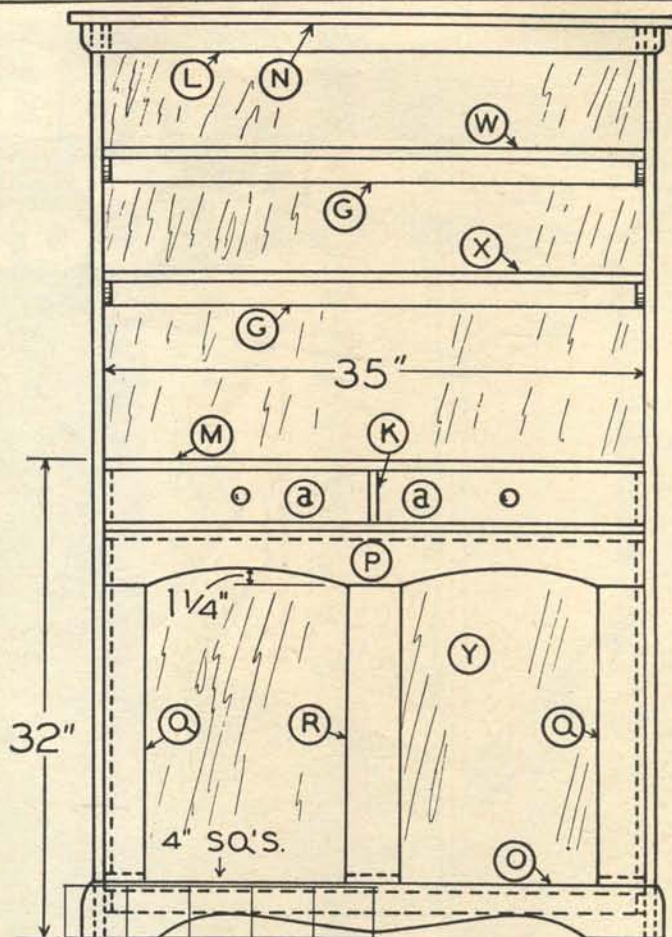
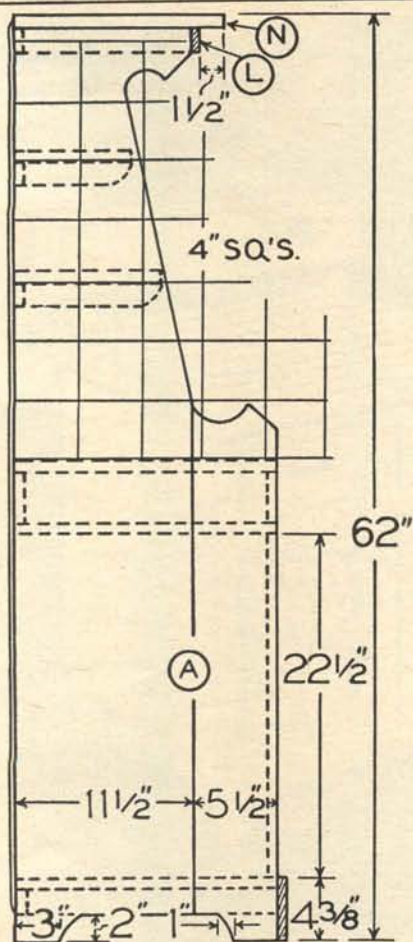
MATERIALS LIST

All 1-in. well-seasoned white pine or Douglas fir. Pine-faced $\frac{3}{4}$ -in. plywood also can be used.

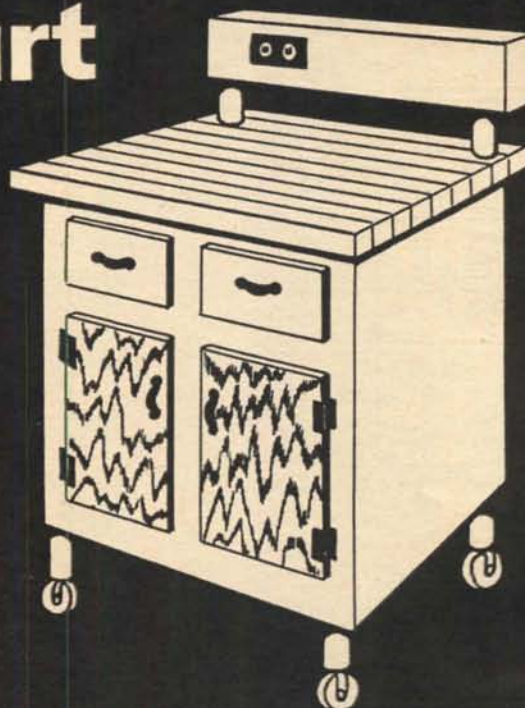
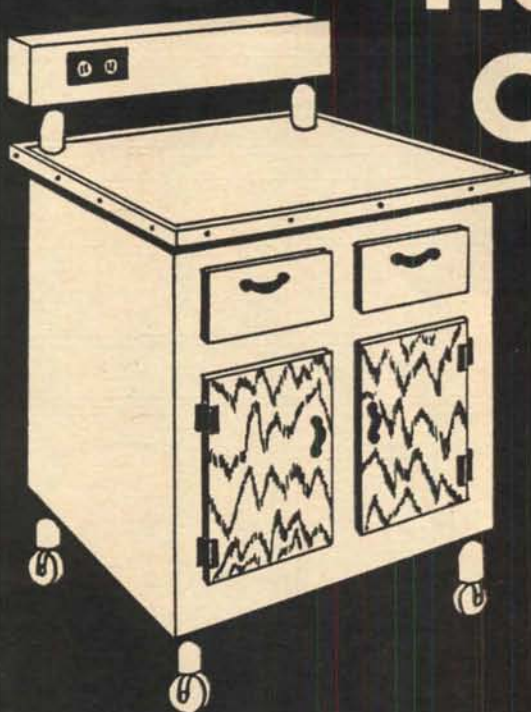
- A—Sides (glue up), 17" x 61 $\frac{1}{4}$ ", 2 req'd.
- B—Bottom Cleat, 1 $\frac{5}{8}$ " x 16 $\frac{1}{4}$ ", 2 req'd.
- C—Center Cleat, 3 $\frac{5}{8}$ " x 15 $\frac{1}{2}$ ", 2 req'd.
- D—Top Cleat, 1 $\frac{5}{8}$ " x 10 $\frac{3}{4}$ ", 2 req'd.
- E—Top-Shelf Cleat, 1 $\frac{5}{8}$ " x 6 $\frac{3}{4}$ ", 2 req'd.
- F—Second-Shelf Cleat, 1 $\frac{5}{8}$ " x 8 $\frac{3}{4}$ ", 2 req'd.
- G—Back Rails, 1 $\frac{5}{8}$ " x 35", 4 req'd.
- H—Wide Back Rail, 3 $\frac{5}{8}$ " x 35", 1 req'd.
- I—Drawer-Support Rails, 2 $\frac{1}{2}$ " x 35", 2 req'd.
- J—Drawer-Support Rails, 2 $\frac{1}{2}$ " x 12", 2 req'd.
- K—Partition, 3 $\frac{5}{8}$ " x 16 $\frac{1}{4}$ ", 1 req'd.
- L—Hood Apron, 1 $\frac{5}{8}$ " x 38", 1 req'd.
- M—Cupboard Top and Bottom, (glue up), 17" x 35", 1 each req'd.
- N—Hood Top (glue up), 13 $\frac{3}{4}$ " x 39 $\frac{1}{2}$ ", 1 req'd.
- O—Apron, 4 $\frac{3}{8}$ " x 38", 1 req'd.
- P—Front-Panel Rail, 3 $\frac{5}{8}$ " x 35", 1 req'd.
- Q—Front-Panel Side Stiles, 2 $\frac{5}{8}$ " x 18 $\frac{7}{8}$ ", 2 req'd.
- R—Front-Panel Center Stile, 3 $\frac{5}{8}$ " x 18 $\frac{7}{8}$ ", 1 req'd.
- S—Top Front Panel Cleat, $\frac{3}{4}$ " x 35", 1 req'd.
- T—Top Front Panel Cleat, $\frac{3}{4}$ " x 21", 2 req'd.
- U—Corner Blocks for Front Panel, 2 $\frac{5}{8}$ " x 3 $\frac{1}{2}$ ", 2 req'd.
- V—Center Brace for Front Panel, 3 $\frac{5}{8}$ " x 4 $\frac{1}{2}$ ", 1 req'd.
- W—1 Top Shelf, 7 $\frac{1}{2}$ " x 35", 1 req'd.
- X—Second Shelf, 9 $\frac{1}{2}$ " x 35", 1 req'd.
- Y—Backing ($\frac{1}{4}$ " Plywood), 36" x 59 $\frac{1}{2}$ ", 1 req'd.
- a—Drawer Fronts, 3 $\frac{5}{8}$ " x 17", 2 req'd.
- b—Drawer Backs and Sub-Fronts, 2 $\frac{7}{8}$ " x 15 $\frac{3}{4}$ ", 4 req'd.
- c—Sides ($\frac{1}{4}$ " Plywood), 3 $\frac{3}{8}$ " x 15 $\frac{1}{2}$ ", 4 req'd.
- d—Drawer Bottoms ($\frac{1}{4}$ " Plywood), 15 $\frac{1}{2}$ " x 15 $\frac{3}{4}$ ", 2 req'd.

MISCELLANEOUS

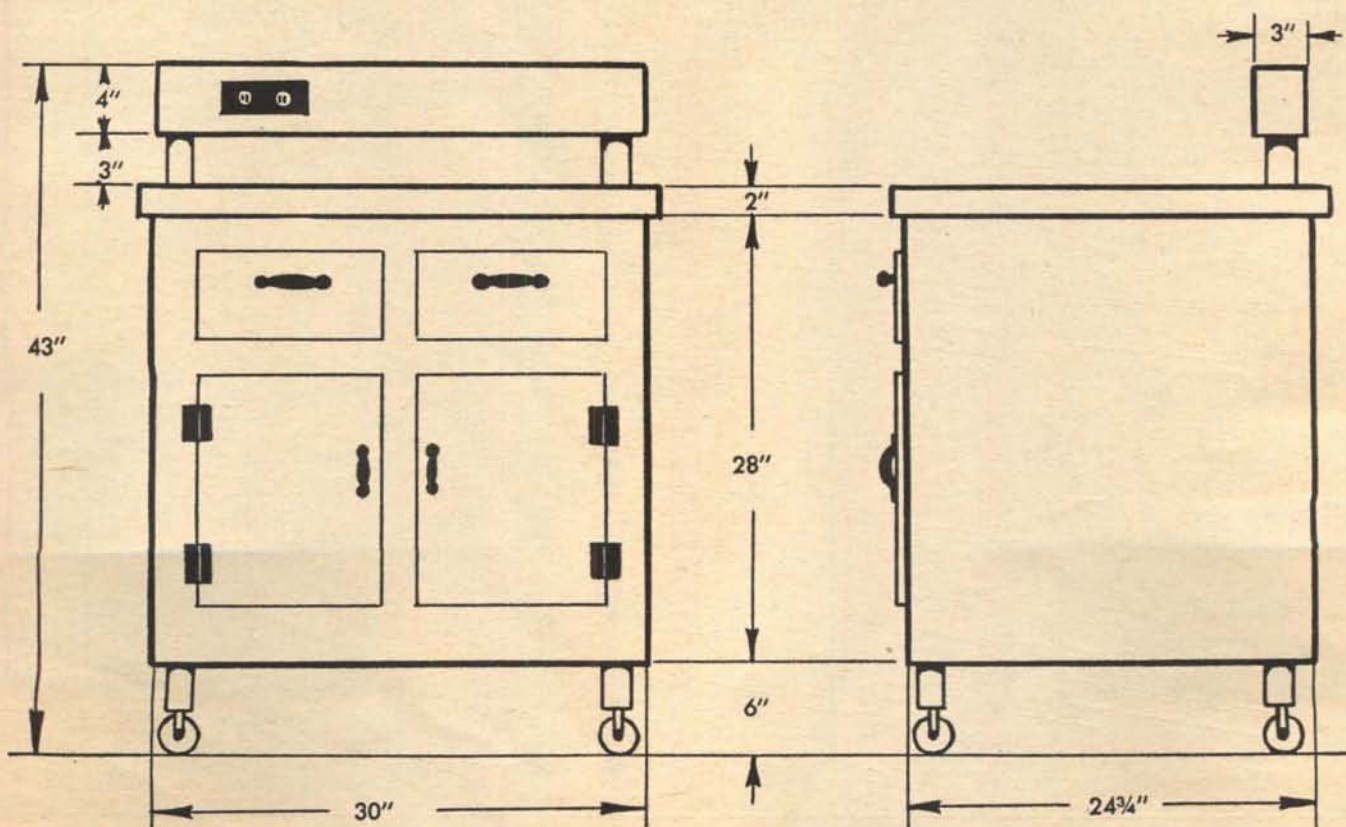
- Mending Plates, $\frac{1}{2}$ " x 1 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ ", 2 req'd.
- Brass Knobs, $\frac{3}{4}$ " Dia., 2 req'd.
- Inside-Corner Angles, $\frac{5}{8}$ " x 4" x 4", 4 req'd.
- Flathead Woodscrews, 1 $\frac{1}{4}$ " and 2" No. 8.
- Nails, corrugated and finishing.
- Glue, White Liquid Resin. Δ Δ



Hobby Cart



JOHN F. CLARK



WHERE LACK OF SPACE for a hobby bench or workshop is your problem, this hobby cart might be the answer. Your wife also might like a duplicate in her kitchen, with a top of plastic laminate (Formica, Micarta, Textolite, etc.) instead of the wooden top needed for a workshop model. The duplex receptacle in the backboard can be used for power tools or appliances, the cabinet and drawers are fine for tools and shop supplies, or cookware and utensils. The casters permit the cart to be rolled to wherever it is needed.

Hand tools can be used in the construction of the unit, although power tools will speed up and simplify the job. If you have no workshop (which might be why you are building the cart) your lumber dealer may be able to cut the pieces for you to assemble. The sides, bottom and back of the cabinet are assembled first. The front members then are joined with mortise and tenon joints, being glued and clamped. This front assembly then is nailed to the cabinet sides and bottom. Install the legs, using washers under the heads of the sheet metal screws.

Assemble the backboard, drill for the legs and hold them in place with sheet metal screws. Install the receptacle box and run the extension cord out through a hole in the back. Wind the cord around the legs between backboard and top when it is not being used. $\Delta \Delta$

MATERIALS LIST

CABINET

- $\frac{3}{4}$ " Plywood
- 1—Sides, 24" x 28", 2 req'd.
- 2—Bottom, 23 $\frac{1}{4}$ " x 29 $\frac{1}{4}$ ", 1 req'd.
- 3—Back, 28" x 30", 1 req'd.
- 4—Top, 26 $\frac{3}{4}$ " x 32", 1 req'd.

(or 2 x 2s glued together)

Front Members (allowance is made for 1" mortise and tenon)

1" Solid Stock

5—2" x 28", 2 req'd.

6—3" x 28", 1 req'd.

7—2" x 28", 1 req'd.

8—2" x 25", 1 req'd.

9—2" x 14", 2 req'd.

$\frac{3}{8}$ " Plywood

10—Doors, 12 $\frac{3}{4}$ " x 15 $\frac{3}{4}$ ", 2 req'd.

DRAWERS

$\frac{3}{8}$ " Plywood

11—Front, 6 $\frac{3}{4}$ " x 12 $\frac{3}{4}$ ", 2 req'd.

15—Bottom, 10 $\frac{3}{4}$ " x 19", 2 req'd.

1" Solid Stock

12—Front, 5 $\frac{3}{4}$ " x 11", 2 req'd.

13—Side, 5 $\frac{3}{4}$ " x 21", 4 req'd.

14—Back, 6 $\frac{1}{2}$ " x 11", 2 req'd.

Rail, 4" x 23 $\frac{1}{4}$ ", 3 req'd.

Guide, 2" x 23 $\frac{1}{4}$ ", 1 req'd.

Guide, 1 $\frac{1}{4}$ " x 20", 2 req'd.

BACKBOARD

1" Solid Stock

16—Side, 4" x 30", 2 req'd.

17—End, 3" x 4", 2 req'd.

18—Top, 3" x 30", 1 req'd.

HARDWARE

2 sets of hinges

2 door pulls

2 drawer pulls

Aluminum tubing, 1 $\frac{1}{2}$ " dia., 2 pcs.

39 $\frac{1}{4}$ ", 2 pcs. 31"

4 casters, wheel dia. about 2".

Receptacle box, receptacle, plate.

Extension cord, 10 ft.

2" Sheet metal screws, 8 req'd.

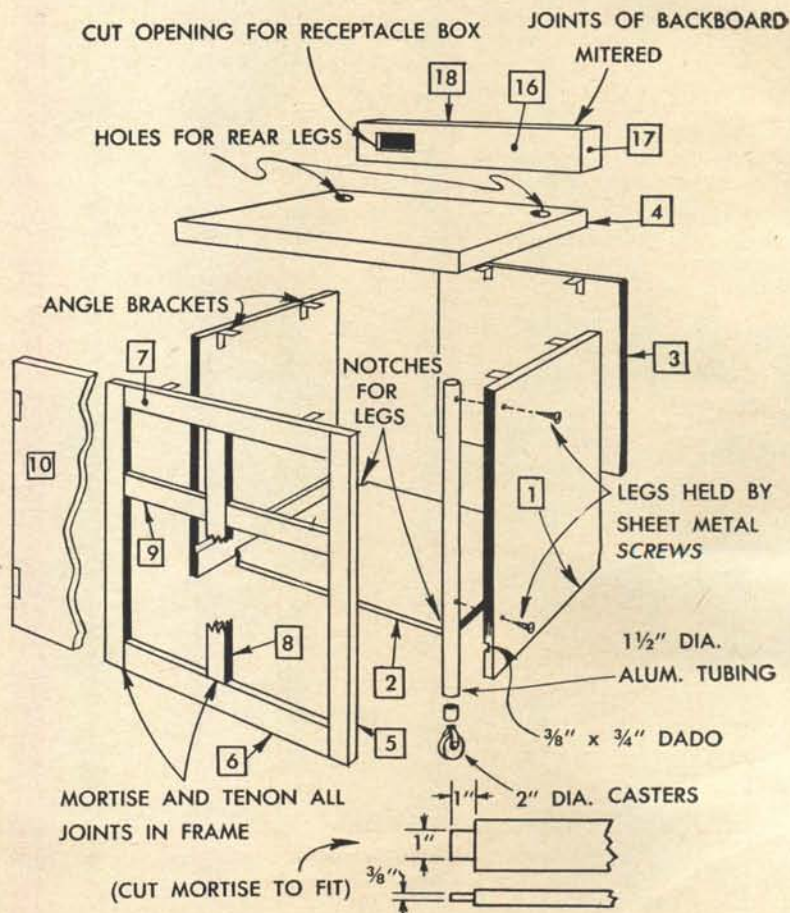
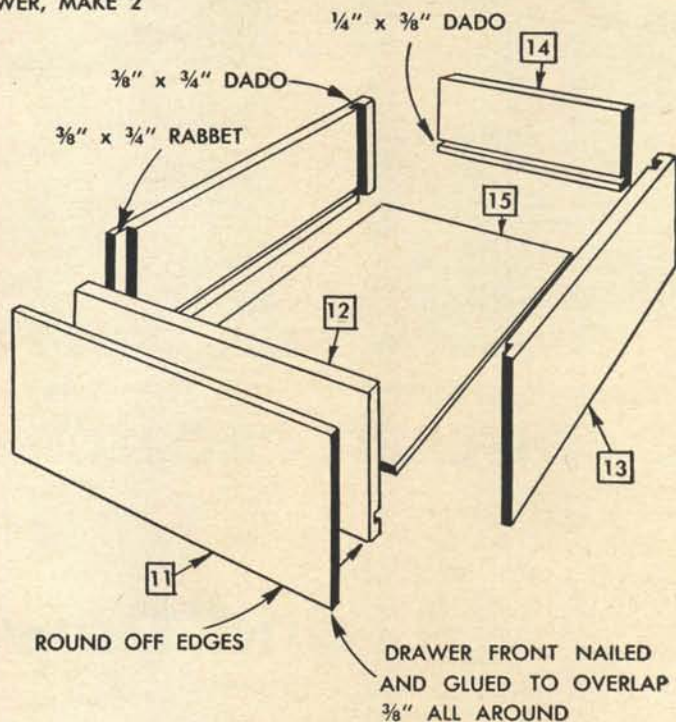
Metal edging (for alternate top).

6d finish nails.

Angle Brackets, 8 req'd.

Wood screws for top.

DRAWER, MAKE 2





1 Sanded smooth and painted white, concrete bench is strikingly attractive against green of lawn and shrubbery. Concrete blocks are used for "legs."

TWO CONCRETE PROJECTS:

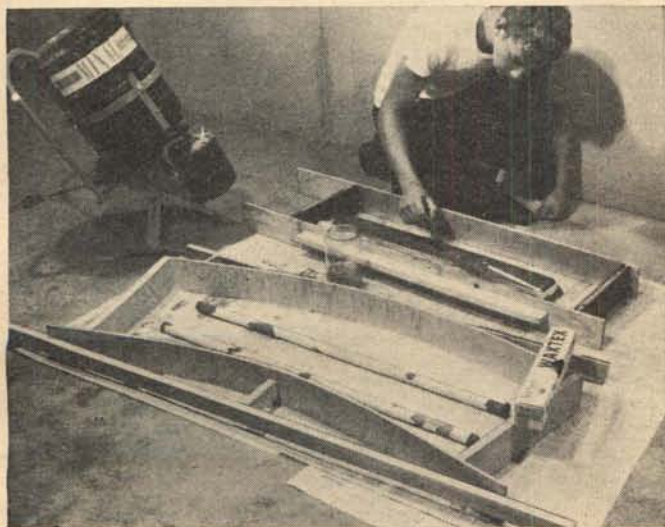
FRED STEBBINS

Garden Bench and Downspout Deflector

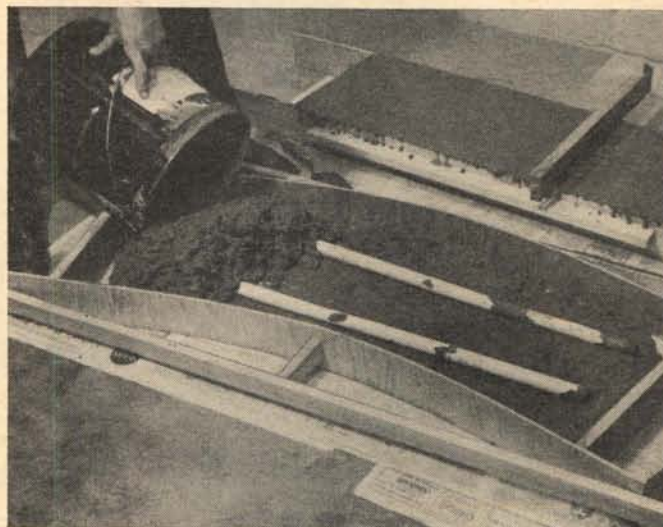
BUILDING FORMS AND MIXING CONCRETE require very little skill, but can produce big dividends for a homeowner. Both sides of the character of concrete are utilized in the projects described in this article; its beauty in a garden bench, Figs. 1 and 5, its durability in a downspout deflector, Fig. 6. Only a small amount of concrete is used for either project, and it can be mixed by hand, but renting a small mixer will eliminate much of the work. The one used for the bench and deflector was a Kohl Mixal (we have one in the Model Shop, Ed.) which mixes 5 gal., or 50 lb., in a matter of minutes. If you buy bulk material, use a mix of 4 parts crushed gravel, 2 parts sand and 1 part cement. For the original we made sure of an accurate mix by buying Sakrete Concrete Mix. This ready-mixed material requires only the addition of water. It can be purchased at most building-supply deal-

ers and at some hardware stores.

Forms for the bench and deflector were made of scrap wood from the workshop, Fig. 2. Lengths of 1 x 4 were used for the sides and ends of the deflector form and for the ends of the bench form. For the curving front and back of the bench top, 1/4-in. plywood proved to be adequate when braced with strips of 1-in. stock. Note that the drawing shows a somewhat different design for the bench top than the photos; the additional bracing shown in the drawing will help prevent any distortion of the form. The curve of the bench is not critical; bend the plywood to a pleasing arc, then fit the rectangular frame around it and reinforce with short lengths of stock. Two lengths of pipe, steel angles or other metal shapes are used to reinforce the poured concrete in the bench, Fig. 3. No bottoms are used in the forms, and the



2 Level garage floor was used as bottom of forms. Newspapers first were placed on floor, then covered with waxed paper to prevent sticking to concrete. Ordinary motor oil was brushed on insides of forms.



3. Portable concrete mixer (Kohl Mixal) saved considerable labor and time in making the bench and deflector. When about 1 1/2 in. of mix were poured, two lengths of pipe were placed for reinforcement.

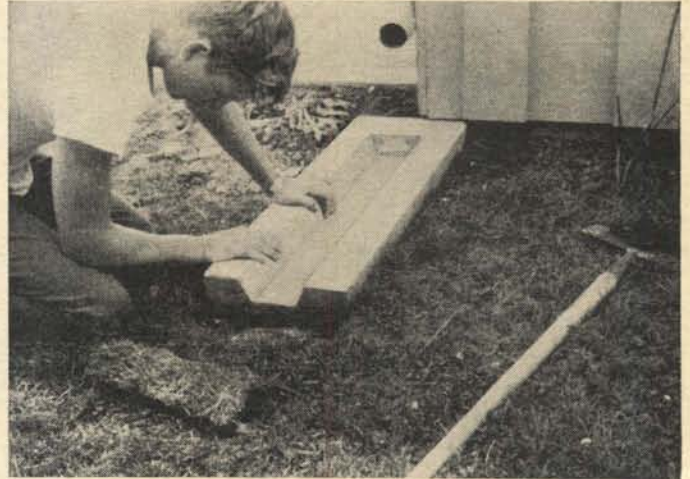


4. One bench was set on lawn, which required pouring foundation. Form was used as pattern to cut away sod, make excavation below frost line. Concrete was poured, then concrete-block legs were positioned.

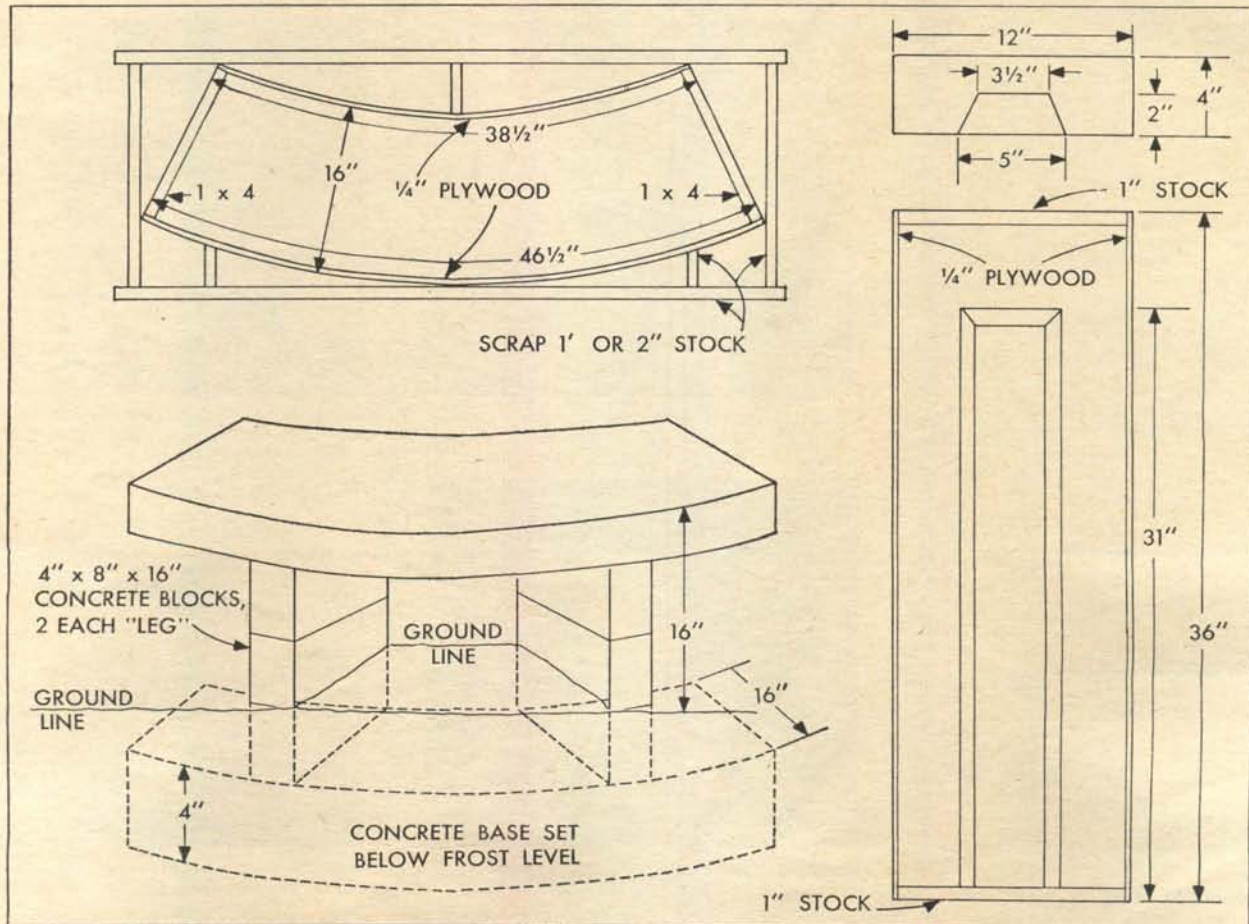


5. On patio, legs were set directly on concrete, flush mortar joint used between blocks. Thin mixture of sand and cement was brushed on to make block appear solid, then paint was applied over this.

"core" for the downspout deflector is simply positioned in the form, and care is taken to see that it does not shift when concrete is poured over it. The flat floor of a garage or the surface of a driveway is used for the bottom of the forms. Newspapers provide a "cushion," over which waxed paper is placed as a "parting agent." After the concrete is poured tamp it well with a broom handle or dowel to eliminate any voids. Overfill the forms slightly, then strike off the excess with a straight-edge board. Allow the concrete to season several days, then remove the forms. Standard 4 x 8 x 16-in. concrete blocks are used for "legs" of the bench. Sand the bench top smooth, then paint the blocks with a thin mix of sand and cement. When the coating is dry, paint the bench with a masonry sealer, then a masonry paint. △ △



6. Replacing broken deflector with newly-cast unit required removal of some sod, regrading soil next to the house. The first heavy rain showed the deflectors worked fine. Better concrete and design assures long life.



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Forsythia, Yellow, 1 to 2 ft.	.10 ea.
Pink Spirea, 1 to 2 ft.	.10 ea.
Pink Flowering Almond, 1 to 2 ft.	.39 ea.
Tamarix, Pink Flowers, 1 to 2 ft.	.39 ea.
Red Snowberry, 1 to 2 ft.	.12 ea.
Red Bush Honeysuckle, 1 to 2 ft.	.30 ea.
Red Flowering Quince, 1 to 2 ft.	.25 ea.
Persian Lilac, Purple Flowers, 1 to 2 ft.	.20 ea.
Hydrangea P.G., 1 to 2 ft.	.15 ea.
Mock Orange, 1 to 2 ft.	.12 ea.
Sweet Shrub, 1 to 2 ft.	.15 ea.
Rose Sharon, Mixed Colors, 1 to 2 ft.	.10 ea.
Althea Double Red, 1 to 2 ft.	.15 ea.
Japanese Snowball, 1 to 2 ft.	.59 ea.
Mallow Marvel, Mixed Colors	.15 ea.
Red Osier Dogwood, 1 to 2 ft.	.10 ea.
Old Fashion Lilac, 1 to 2 ft.	.59 ea.
Althea Double Purple, 1 to 2 ft.	.15 ea.
Red Leaf Barberry, 1 ft.	.35 ea.
Green Leaf Barberry, 1 to 2 ft.	.15 ea.
Vitex Purple, 1 to 2 ft.	.19 ea.
Russian Olive, 1 to 2 ft.	.19 ea.
Pussy Willow, 1 to 2 ft.	.19 ea.
Pink Azalea, Native Collected, 1 to 2 ft.	.39 ea.
Spirea Thunbergii, 1 to 2 ft.	.19 ea.
Althea, Pink, 1 to 2 ft.	.19 ea.
Deutzia, White, 1 to 2 ft.	.12 ea.

EVERGREENS

Glossy Abelia, 1/2 to 1 ft.	.25 ea.
Short Leaf Pine, Native Collected, 1 to 2 ft.	.19 ea.
American Holly, 1/2 to 1 ft.	.29 ea.
Cherry Laurel, 1/2 to 1 ft.	.29 ea.
Mountain Laurel, Native Collected, 1 ft.	.29 ea.

FLOWERING TREES

Dwarf Red Buckeye, 1/2 to 1 ft.	.69 ea.
Magnolia Grandiflora, 1 to 2 ft.	.69 ea.
Magnolia Grandiflora, 3 to 4 ft.	1.49 ea.
Mimosa, Pink, 2 to 3 ft.	.15 ea.
Mimosa, Pink, 3 1/2 to 5 ft.	.25 ea.
American Red Bud, 2 to 3 ft.	.25 ea.
Chinese Red Bud, 1 to 2 ft.	.49 ea.
Golden Chain Tree, 1 to 2 ft.	.98 ea.
White Dogwood, 2 to 3 ft.	.19 ea.
White Dogwood, 3 to 5 ft.	.39 ea.
Pink Flowering Dogwood, 2 ft.	1.20 ea.
Pink Flowering Dogwood, 3 to 5 ft.	2.95 ea.
Golden Rain Tree, 1 to 2 ft.	.49 ea.
Purple Leaf Plum, 2 to 3 ft.	.49 ea.
Red Flowering Peach, 2 to 3 ft.	.45 ea.
Red Flowering Crab, 2 to 3 ft.	.69 ea.
Tulip Poplar, Native Collected, 2 to 3 ft.	.49 ea.
Norway Maple, 2 to 3 ft.	1.49 ea.
Pin Oak, 2 to 3 ft.	.98 ea.
Sycamore, 2 to 3 ft.	.19 ea.

SHADE TREES

Catalpa Fish Bait Tree, 2 to 3 ft.	.19 ea.
Chinese Elm, 2 to 3 ft.	.19 ea.
Weeping Willow, 2 to 3 ft.	.25 ea.
Silver Maple, 2 to 3 ft.	.15 ea.
Ginkgo Tree, 1 to 2 ft.	.49 ea.
Lombardy Poplar, 2 to 3 ft.	.12 ea.
Lombardy Poplar, 3 1/2 to 5 ft.	.20 ea.

FRUIT TREES

Elberta Peach, 2 to 3 ft.	.39 ea.
Belle Ga. Peach, 2 to 3 ft.	.39 ea.
J. H. Hale Peach, 2 to 3 ft.	.39 ea.
Yellow Delicious Apple, 2 1/2 to 3 ft.	.49 ea.
Red Delicious Apple, 2 1/2 to 3 ft.	.49 ea.
Stayman Winesap Apple, 2 1/2 to 3 ft.	.49 ea.
Montmorency Cherry, 2 1/2 to 3 ft.	.98 ea.
Kieffer Pear, 2 to 3 ft.	.98 ea.
Burbank Plum, 2 to 3 ft.	.49 ea.
Red June Plum, 2 to 3 ft.	.49 ea.
Damson Plum, 2 to 3 ft.	.49 ea.
Bruce Plum, 2 to 3 ft.	.49 ea.
Apricot Tree, 2 to 3 ft.	.49 ea.

VINES

Bittersweet	.15 ea.
Red Scarlet Honeysuckle	.25 ea.
Concord Grape Vine	.29 ea.
Wisteria Purple	.29 ea.

NUT TREES

Hardy Pecan Seedlings, 2 to 3 ft.	1.69 ea.
Butter Nut, 1 to 2 ft.	.39 ea.
Black Walnut, 1 to 2 ft.	.39 ea.
Chinese Chestnut, 1 to 2 ft.	.89 ea.

HEDGE PLANTS

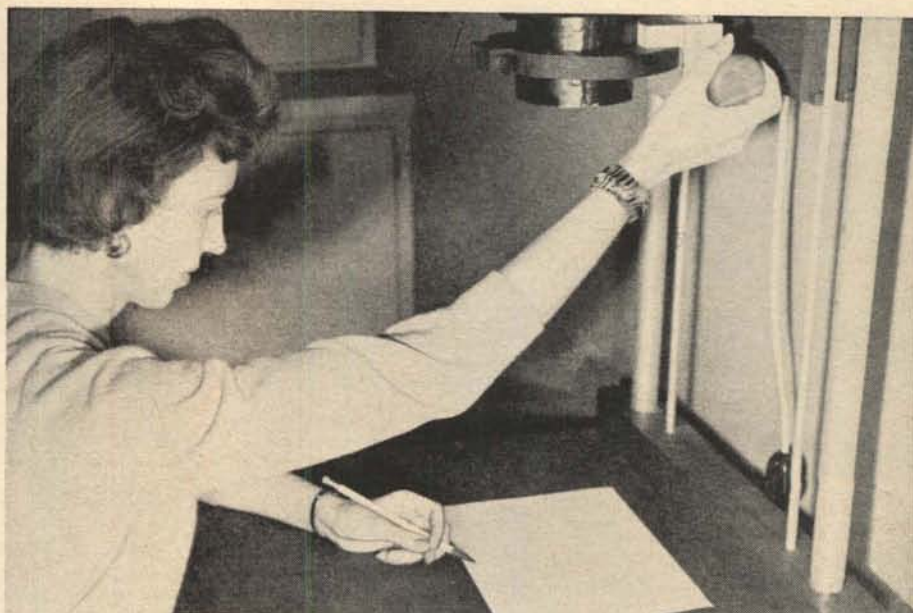
Evergreen South Privet, 1 to 2 ft.	.02 ea.
California Privet, 1 to 2 ft.	.06 ea.
North Privet, 1 to 2 ft.	.07 ea.
Multiflora Rose, 1 to 2 ft.	.10 ea.

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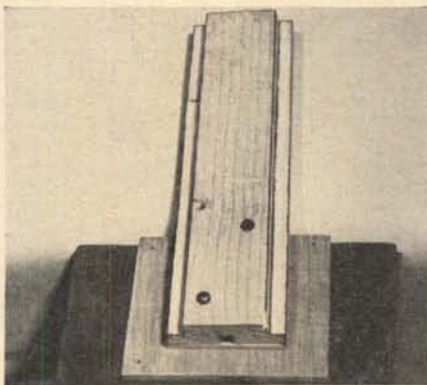


Slightly turning either of the knobs raises and lowers the lens tube a fraction of an inch, to bring the image into sharp focus. For illustration accessory is unfinished, should be painted black.

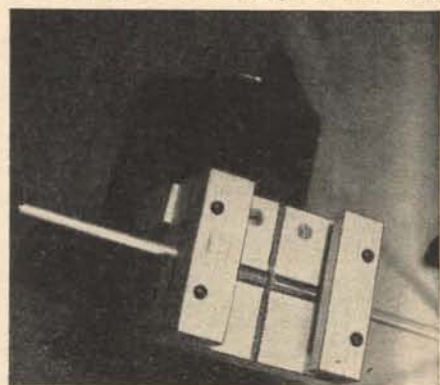
Accessory For Opaque Projector

ONE PROBLEM we found with the Opaque Projector for Larger Copy (Nov.-Dec. 1960) was that it was dif-

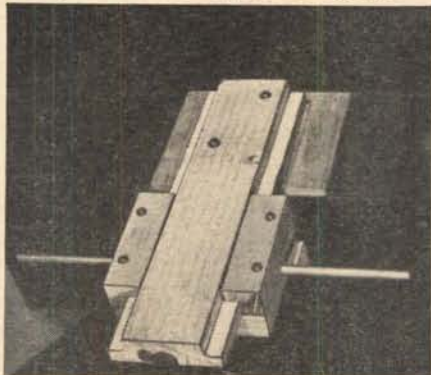
ficult to focus it sharply by sliding the lens tube. The accessory described here was designed and built



Spacer (plywood) was used to position member that holds pinion. This assembly is screwed directly to lens-tube support for rigidity.



Copper-tubing spacers keep gear centered on shaft cut from length of brass rod. This member is fitted to bracket that screws to clamp.



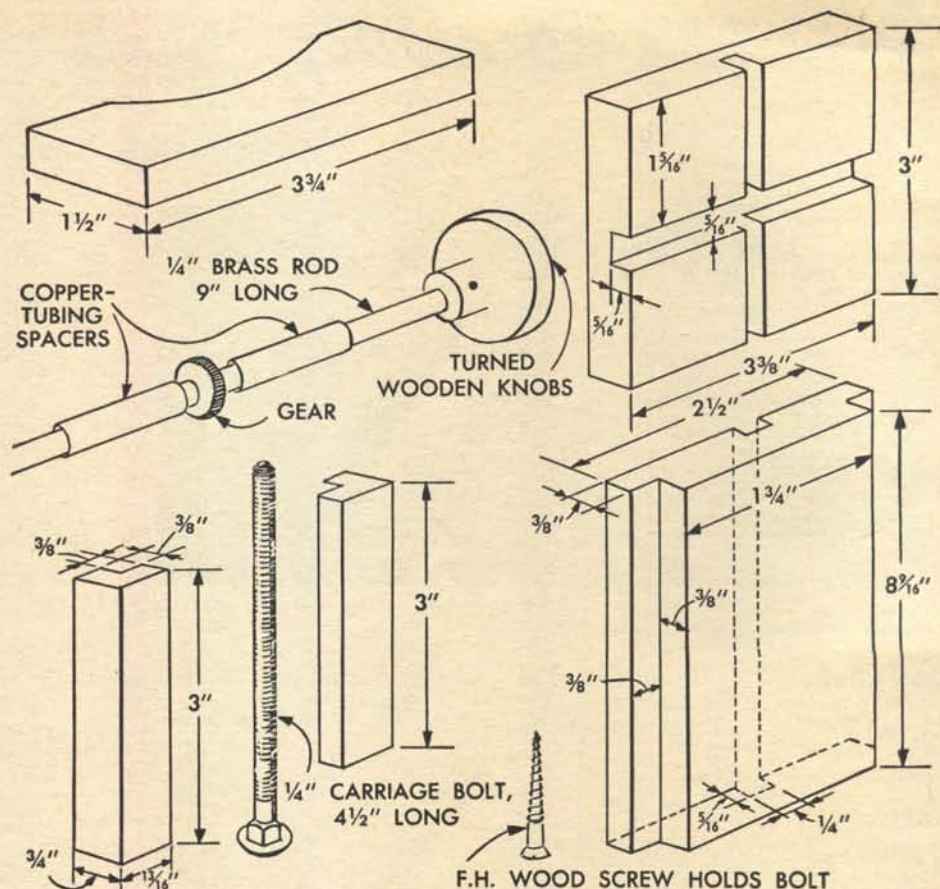
Complete assembly (less turned wooden knobs) is shown here. Note flathead screw that holds carriage-bolt "rack" in place in its slot.



Wooden knobs for accessory are turned from scraps of hardwood, drilled to accept brass rod. Knobs were riveted in place with brads.

to overcome the drawback, as it permits very fine up and down adjustment with a "rack-and-pinion" arrangement. The rack consists of a $\frac{1}{4}$ -in. carriage bolt $4\frac{1}{2}$ in. long, threaded its full length. The pinion gear was picked out of the shop scrap box, and probably came from a discarded alarm clock. Regular rack-and-pinion sets can be obtained, if this improvised gearing does not suit your individual needs or workshop facilities. Scraps of straight-grained white pine can be used for the other components of the accessory. They are cut on a table saw or radial-arm saw. Make all parts a snug fit, to eliminate any play in the sliding members. On the original, strips of shim brass were cemented to the faces of the sliding members, both to reduce the wear factor and assure a snug fit.

To attach the accessory it is necessary, of course, to cut the splitting clamp from the lens-tube support. The edge of the clamp opposite the split is cut straight, $1\frac{1}{4}$ in. from the inner diameter, so that it fits flat against the accessory as indicated. While our accessory was left unfinished for purposes of illustration, it should be given a coat of flat-black enamel to match projector. $\triangle \triangle$



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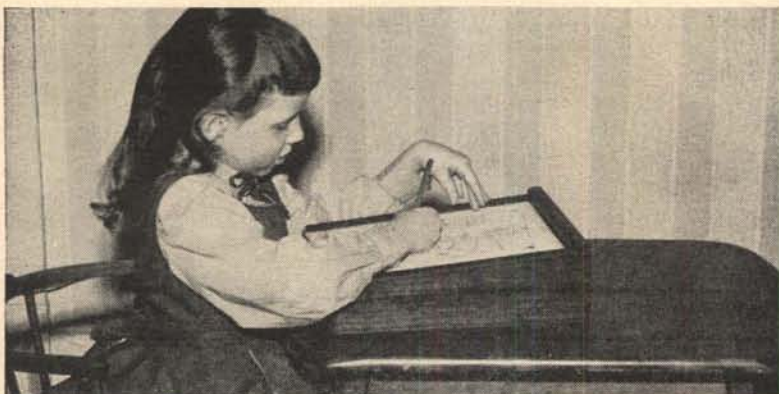
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For name of nearest dealer, consult the YELLOW PAGES.



Child's Drawing Desk

HOWARD R. CLARK



Your youngster will spend many enjoyable hours at this drawing desk. The paper is almost endless, and all sorts of pencils and crayons can be kept in the handy drawer.

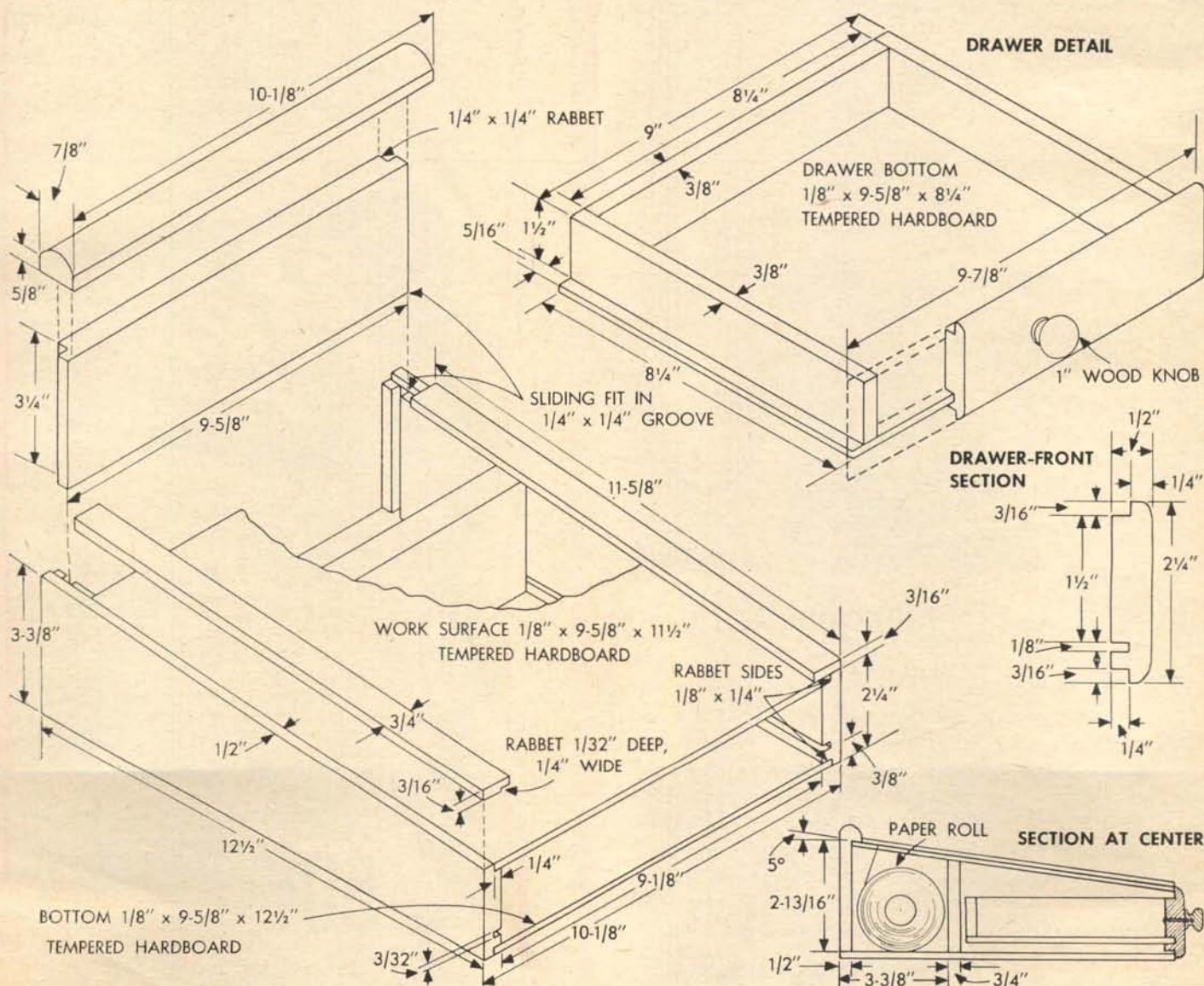
MOST CHILDREN like to print or draw, and are tempted to use any surface available unless something suitable

is provided. This desk is the answer; it provides a generous supply of paper, has a storage drawer for pencils

and crayons and is portable enough to be carried wherever the child wishes to use it.

The paper supply consists of a roll of 18-in.-wide unglazed shelf paper sawed in half to provide two 9-in. rolls. As the paper is used, it is pulled forward to expose a fresh section. A new roll is installed by removing the back panel that slips into $\frac{1}{4} \times \frac{1}{4}$ -in. grooves. For budding engineers, the paper guides and back panel provide surfaces against which a triangle can be held for drawing vertical or horizontal lines. Construction of the desk is shown clearly in the drawing. All parts, except for the top and bottom of the desk, and the bottom of the drawer that are tempered hardboard, are cut from solid stock. Note that the drawer bottom projects to act as drawer guides.

If there might be a problem of rough usage, it is suggested that $\frac{1}{4}$ -in. hardboard be used, the grooves being widened to accommodate it. Round the edge of the top over which the paper is pulled, but leave the opposite edge sharp to act as a "cutting" edge. $\triangle \triangle$

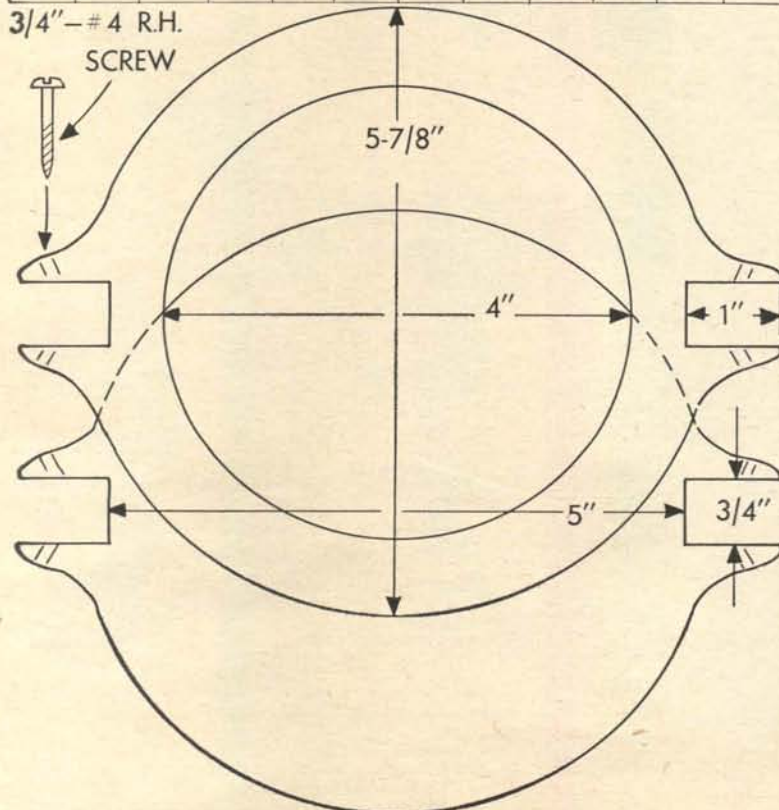
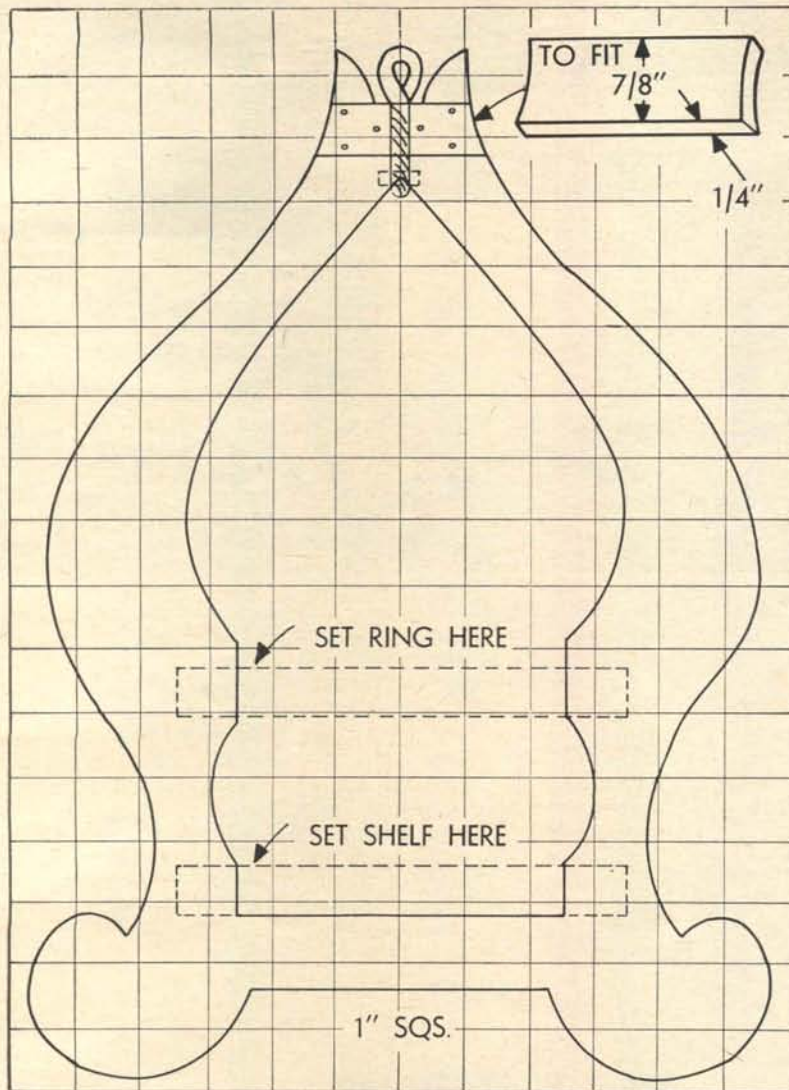


Hanging Planter

DICK HUTCHINSON



Different in design than the average planter, the modified "lyre" shape of this hanging unit will go well with any sort of plant. Hanging ivy is used in the original; the color of the planter is a grass green. Any color can be used to suit.



EITHER A HAND SCROLL SAW or an electric jig saw can be used to cut the parts for this attractive hanging planter. Finished in any desired color it will add a touch of beauty to an outdoor patio, basement game room or family room. The frame of the planter can be cut from clear, straight-grained 1-in. white pine, or from $\frac{3}{4}$ -in. plywood. If the latter is used, it should be exterior-grade when the planter is planned for an outdoor location. To assure identical curves on the frame, use the following stunt: make a pattern by enlarging the squared drawing, of just one half the frame. Fold the paper along the center line, then place carbon paper (carbon side up) on the plain side of the paper and trace over the half pattern. When the paper is unfolded, you will have a complete, accurate pattern. Now, use the carbon paper and trace the pattern onto the wood. Cutting out a pattern is not recommended, as the paper is difficult to keep in place when it is traced. Light cardboard, however, can be used in that manner. Before making the ring it is best to measure the clay pot that will be used; the dimensions of these pots will vary slightly. Make the ring to fit the pot, then assemble the hanger with glue and screws. Drill down through the top of the planter to accept an eyebolt and hold it with a nut. For finishing, paint all surfaces with a coat of semi-gloss oil paint, then wipe off immediately with a soft cloth and rub until dry. Over this finish apply two coats of white shellac. Rub each coat lightly with 4/0 steel wool. We would suggest extending the reinforcing blocks to the edges of the frame and cutting them flush with the edges, as indicated in the drawing. $\triangle \triangle$

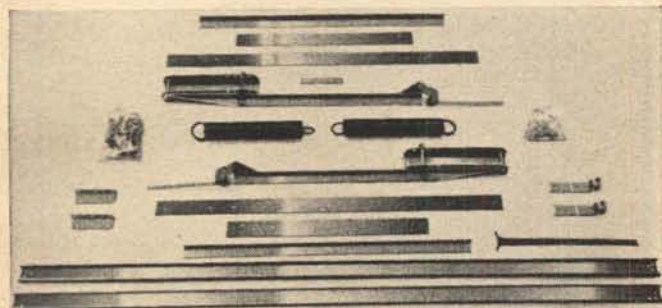


Do-It-Yourself Garage Door

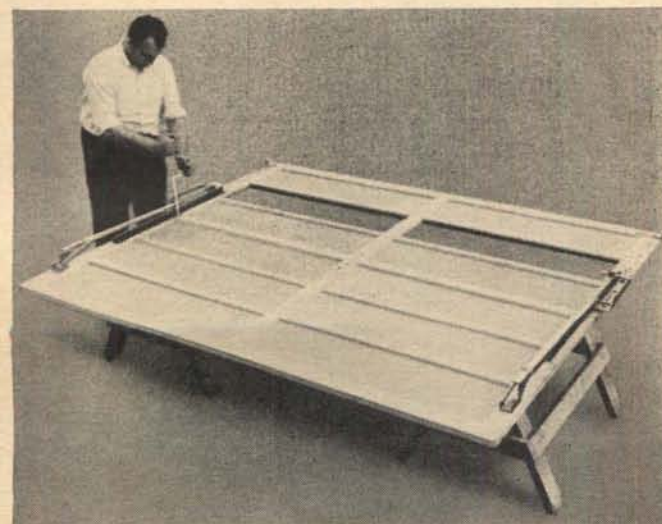
ONLY ABOUT TWO HOURS are required for the average home craftsman to install his own garage door with a kit available nationwide. The one-piece, paneled door has two windows in it for decoration and lighting. All hardware, including the lock, are furnished with the kit. Just four simple steps are required for the installation, as shown in the photos. First step is to fasten the door panels together and attach the necessary hardware and weatherstripping at the top of the door. The assembled door then is positioned in the opening and levelled. It may be necessary to mark the bottom of

the door and plane or saw it to assure a snug fit against the floor. The door is centered in the opening by using $\frac{3}{8}$ in. shims at the sides and bottom. Hardware then is fastened to the door jambs, as per the instructions provided with the kit. The tracks and their brackets come next and are attached to the jambs at one end, while the other ends are suspended from the ceiling or rafters by brackets. Springs, the lock and weatherstripping at the bottom of the door are installed now. The final step is to adjust the tension of the springs.

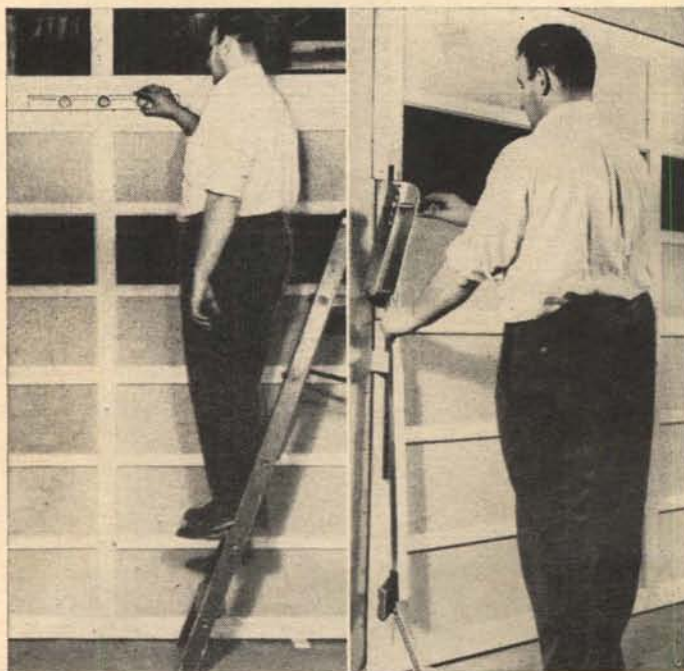
You can save even more money by building your own garage door. The same hardware kit is purchased, and instructions for the construction of the door are furnished. The door frame is cut from 2 x 4s and is covered with $\frac{1}{4}$ -in. plywood. Installation of the hardware is the same. The "Thriftmaster" door is made by the Crawford Door Co., Detroit 5, Mich. $\Delta \Delta$



Complete set of hardware, as shown, is provided with door kit; same type hardware set is used if you prefer to cut and build your own door. Hardware and door can be installed in a couple of hours.

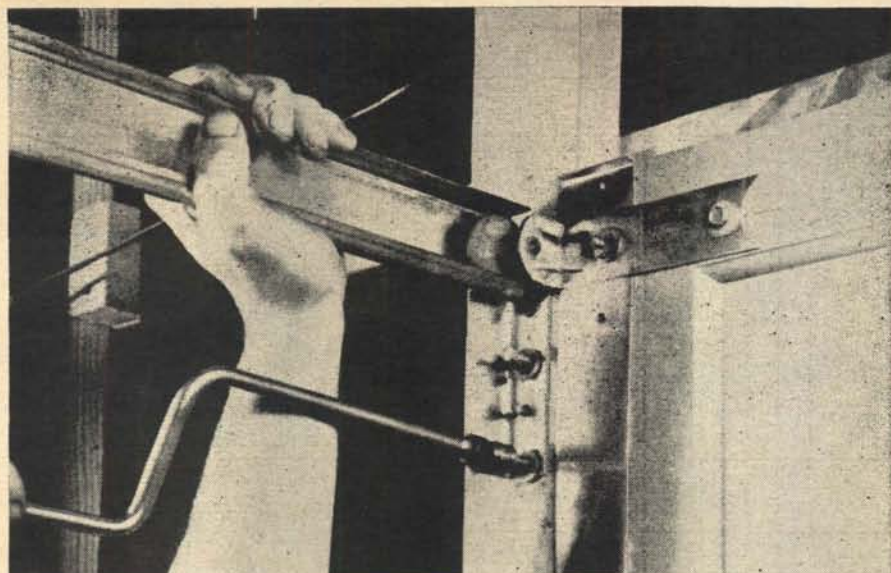


First step with complete kit is to attach hardware to door. No special tools are required. Here homeowner is using speed handle from his set of socket wrenches. Weatherstripping at top of door also is attached.

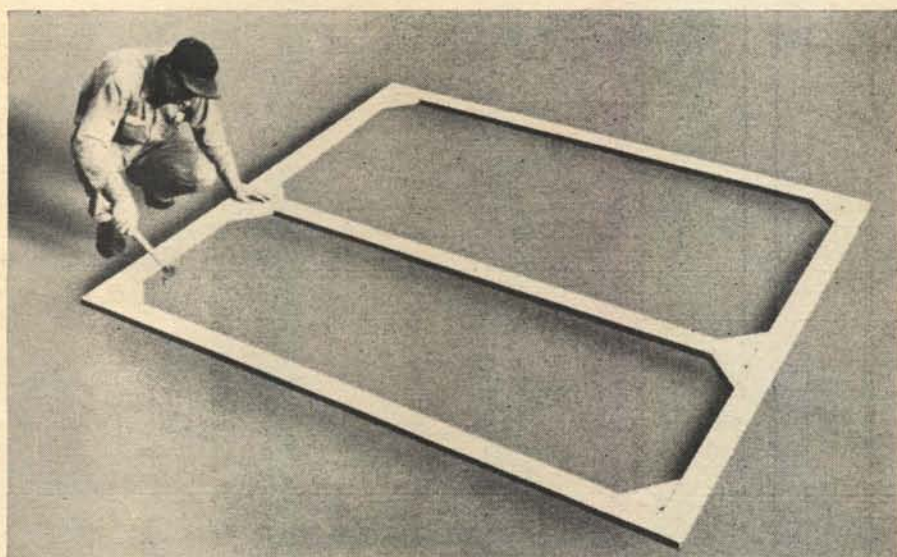


Next step is to place door in the opening and carefully level it. Where necessary, the bottom of the door is marked and cut to fit tightly to floor. Door is centered in opening, using $\frac{3}{8}$ -in. shims at both sides.

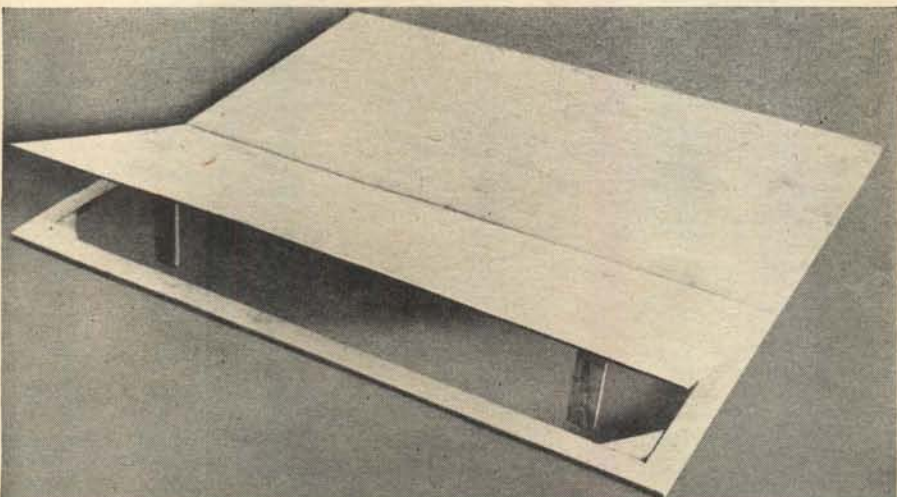
Using lag screws and washers, link and bracket angles are fastened to door jambs. Complete instructions provided with the hardware kit show positions of various pieces of hardware.



Brackets next are bolted to the track, and the rear of the track is suspended. The latter operation requires cutting or bending brackets to fit between ceiling and tracks. Final operations are installing springs, lock and the weatherstripping on the bottom of the door.

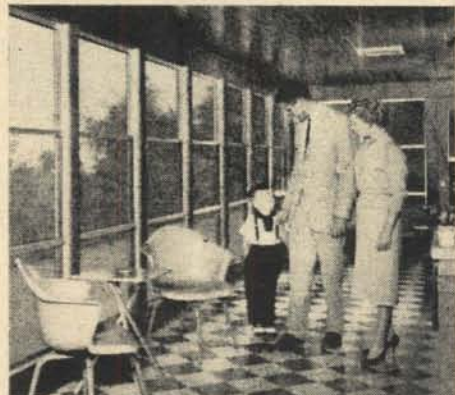


If you want to build your own, one-piece door, you start by building frame of lengths of 2 x 4s, as shown here. All corners are fastened with nails, or, better still, with corrugated fasteners. Crosspiece then is positioned and fastened firmly in place. Frame of door then is complete.



Last step in building your own door is to cover one side with 1/4-in. plywood. Full 4 x 8-ft. sheet of plywood is nailed to top section of door, second sheet of plywood is ripped to 3 x 8 ft. and nailed to lower section of door. Crosspiece of frame will be centered under plywood joint.

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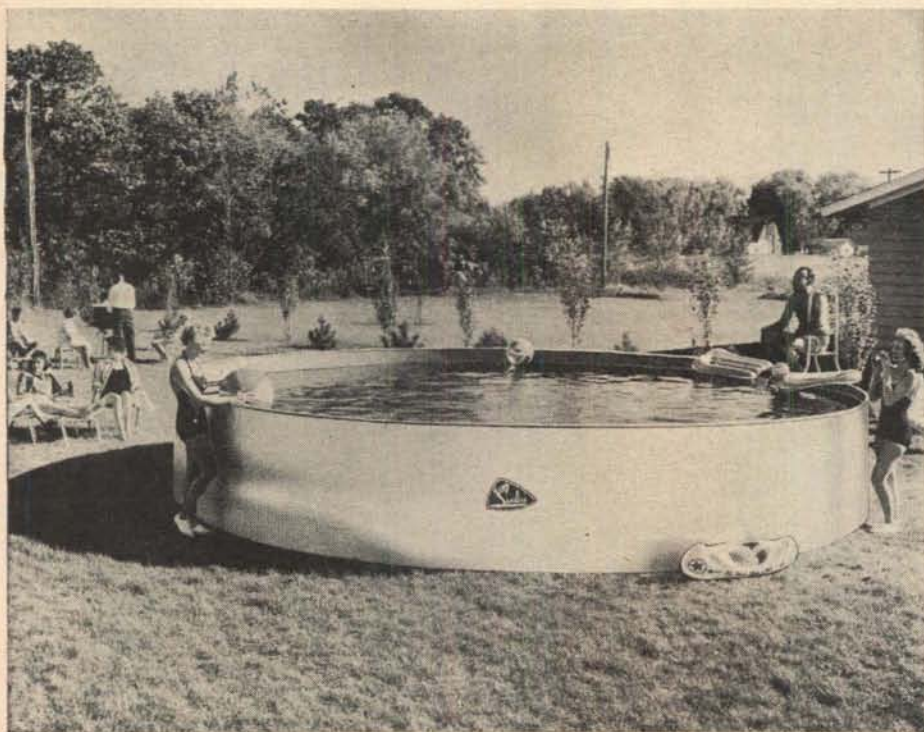
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Just a few hours after you receive the pool, you and your friends can enjoy a swimming party. A flat, level area is the only requirement for the installation of the pool. The 15-ft. pool holds 4,000 gal., and the 18-ft. pool 6,600 gal., the 21-ft. model 9,100 gal., the 24-ft. 11,850 gal.

"Compact" Swimming Pools

JOSEPH A. FERRIS

LIKE COMPACT CARS, compact portable swimming pools were developed to meet the demand for units with low first cost, combined with minimum maintenance expenses.

Of interest to WORKBENCH readers is the manner in which the research and testing of the pools were done. In 1958 the first model was set up indoors at the company's Research and Development Center at New Richmond, Wisconsin. School children of the town swam in it regularly, giving the engineers an opportunity to evaluate the construction features under actual use.

After this preliminary testing, in the spring and summer of 1959 a number of the pools were placed with families that had children. The pools were located in states with varying climatic conditions to check the weather factor. Engineers and specialists observed while families assembled the pools; any problems they encountered were analyzed and necessary changes in the design of the pool, or in the instructions, were made to simplify setting up the pool. Water filtration and conditioning units, as well as new cartridge-type filters, were used on the pools, and both type units kept the water sparkling clear. Floating pool skimmers kept the surface of each pool clear and a pool vacuum took care of keeping the pool bottoms clean. Special rules for sanitation and pool maintenance were made, and records kept on the care of the water, chemicals used, the number of hours filters operated, and the costs involved. In some cases pool liners were damaged purposely and patch-

ing materials and methods were checked. In areas where back yard swimming is seasonal, tests were made on the preparation of pools for storage. Tests also were made of

ladders, pool covers, and chlorine and PH-test kits.

After three years of testing and evaluation the pools, filters and accessories now are ready for this



Husband and wife remove all the components for their pool. Total weight of all items is only 230 lb. In research program, company made study of shipping containers and arrangement of contents to assure minimum weight, maximum ease of removing various components.



First step in assembly is to set up sidewall in circle, lock ends together with strip provided. Main factor here is to be sure ground is flat and level, with no rocks or sharp projections.



Tubular-steel top rail, supplied in 3-ft. sections, is fitted over wall, then vinyl liner is placed inside so that a few inches drop neatly over the sidewall, as demonstrated here by couple.



Vinyl coping is fitted in place next. Coping holds liner securely, also provides neat trim for the top of the pool. Special tool makes installation of the coping a simple process.

swimming season

Called the Sunline series, these budget-price family pools are available in four sizes: 15 ft. in diameter and 3 ft. deep; 18, 21 and 24-ft. models are 3½ ft. deep. All pools have a 1-piece galvanized-steel sidewall, the

ends of which lock with a metal strip. A tubular-steel rail that comes in 3-ft. sections fits over the top edge of the wall, the vinyl liner is draped over this and held in place with a vinyl coping that also provides an attractive trim. The photos on these

pages show the simple steps required for setting up a pool.

For more information on the Sunline pools, contact your local Doughboy Pool dealer or write to: Plastic Div., Doughboy Industries, Inc., New Richmond, Wisconsin. △ △



Last step before putting water in the pool is to smooth and straighten liner. Best method is to start at the center and force wrinkles toward the edge of the pool. This must be done before too much water is put in. Recheck for wrinkles when water is a couple of inches deep.



1. Just a touch on the button of the hand-held transmitter will open or close a garage door from as far away as two hundred feet.



Transistor Garage-Door Opener

SEVERAL FACTORS qualified this garage-door opener for our Workshop-Tested Seal. First was its ease of installation; no special tools were required and the entire job was done in a little over an hour's time. A helper is needed only once, to help raise the receiver end of the trolley to a level position on the steps of a ladder. Once the unit is installed, it simply is plugged into a convenient receptacle to pick up the required 110 volt power supply. The transistor transmitter, Fig. 1, weighs only a few ounces, can be slipped into a pocket or purse, locked in the glove compartment or concealed beneath the front seat of the car. There is absolutely no installation required for the hand-held unit, it is powered by a 9-volt dry cell fitted in the case.



3. Length of tubing for supporting track is provided, is cut to hold track level, support it from ceiling. Ends are flattened, holes drilled.

The first step in the installation of the opener is to locate the center of the door and make a mark near the top. This mark is extended to a point above the door to locate a second bracket. The brackets then are bolted and lag-screwed to the door and to the wall, Fig. 2. In the installation shown there was a length of 2-in. lumber nailed to the wall for the door mechanism, and the fixed bracket was lag-screwed to it. If your garage has only siding and 2 x 4 studding, it would be necessary to nail up a piece of 2-in. stock to permit attaching the bracket. Carriage bolts are used to attach the bracket

to the door. All necessary hardware and bolts are provided.

The track, trolley and receiver—it comes assembled as one unit—now is hooked to the bracket on the wall and the receiver end of the track is raised to a level position and supported on a ladder. A length of tubing, supplied with the opener, then is cut in two lengths to fit between the receiver box and the ceiling joists or roof. The ends are ham-

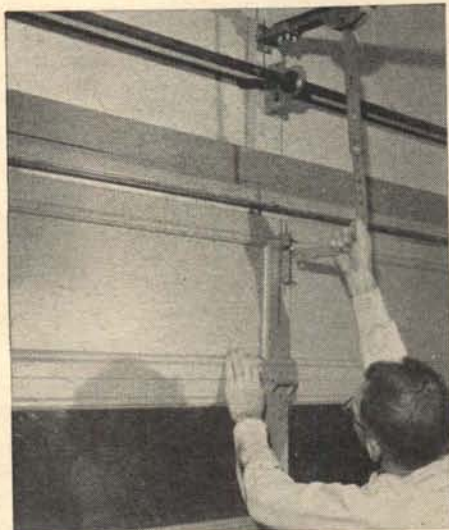


4. Free end of track, on which receiver is attached is supported level on ladder, brackets are cut and fitted to suspend it from ceiling.

2. First step in the installation is to mark above the center of the door frame and on the door for the brackets in described locations.

mered flat and drilled to accept bolts and lag screws, Fig. 3. The supports should be positioned so they slant outward and back from the receiver, Fig. 4, to resist the pull on the unit when the door is being opened. With the installation complete, the hook of the trolley is snapped into the bracket on the door. This hook can be disconnected, Fig. 5, in the event that it is necessary to operate the door manually due to power failure or other conditions.

Final step is to adjust the clutch in the power unit, Fig. 6. The clutch is adjusted so that the door slides to a gentle stop when it contacts the floor. Should the door become swollen from moisture so that it drags, the clutch can be readjusted to compensate for the extra power required. We soldered on an extra 20 ft. to the antenna wire, then ran it from the receiver to one side of the door and across the door. With the extra wire we can operate the door from a distance of about 200 ft. $\Delta \Delta$



5. With end of track hooked to bracket on wall above door, and other end held by brackets, final connection is with lever that can be snapped free for manual operation.



6. Final step is adjustment of clutch in unit. Door should just slide to a gentle stop when it touches floor. If door swells or sticks further adjustment can be made.

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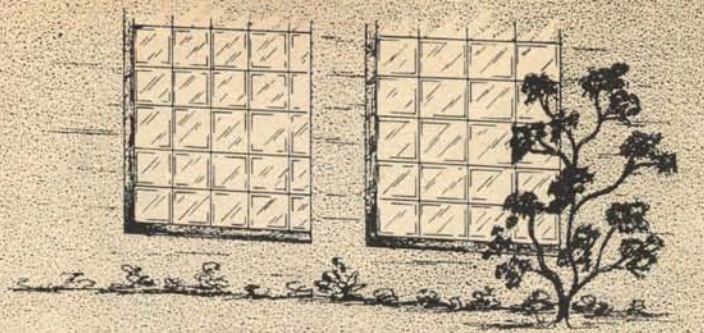
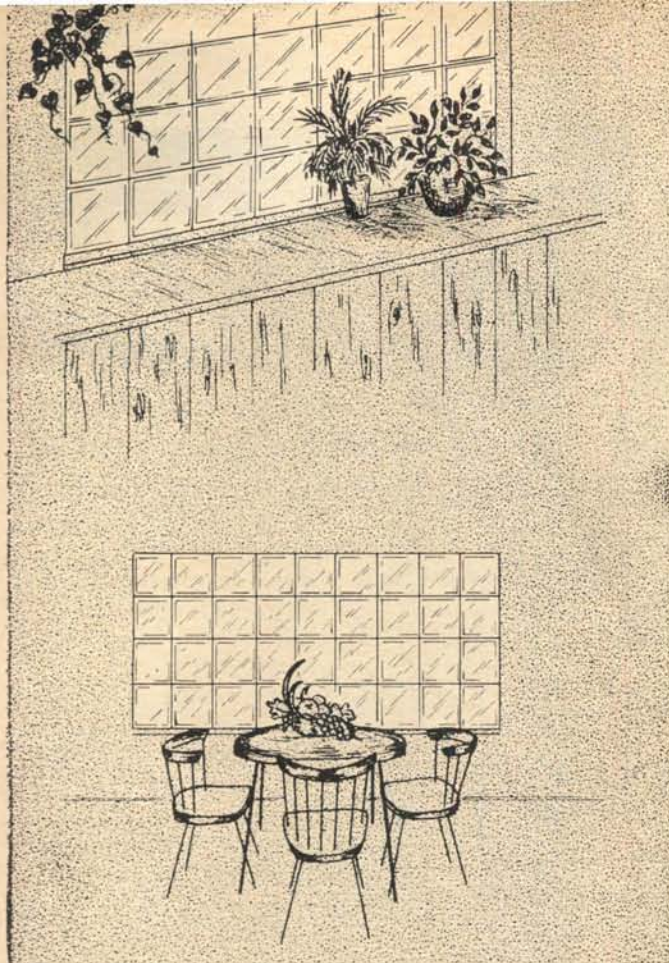
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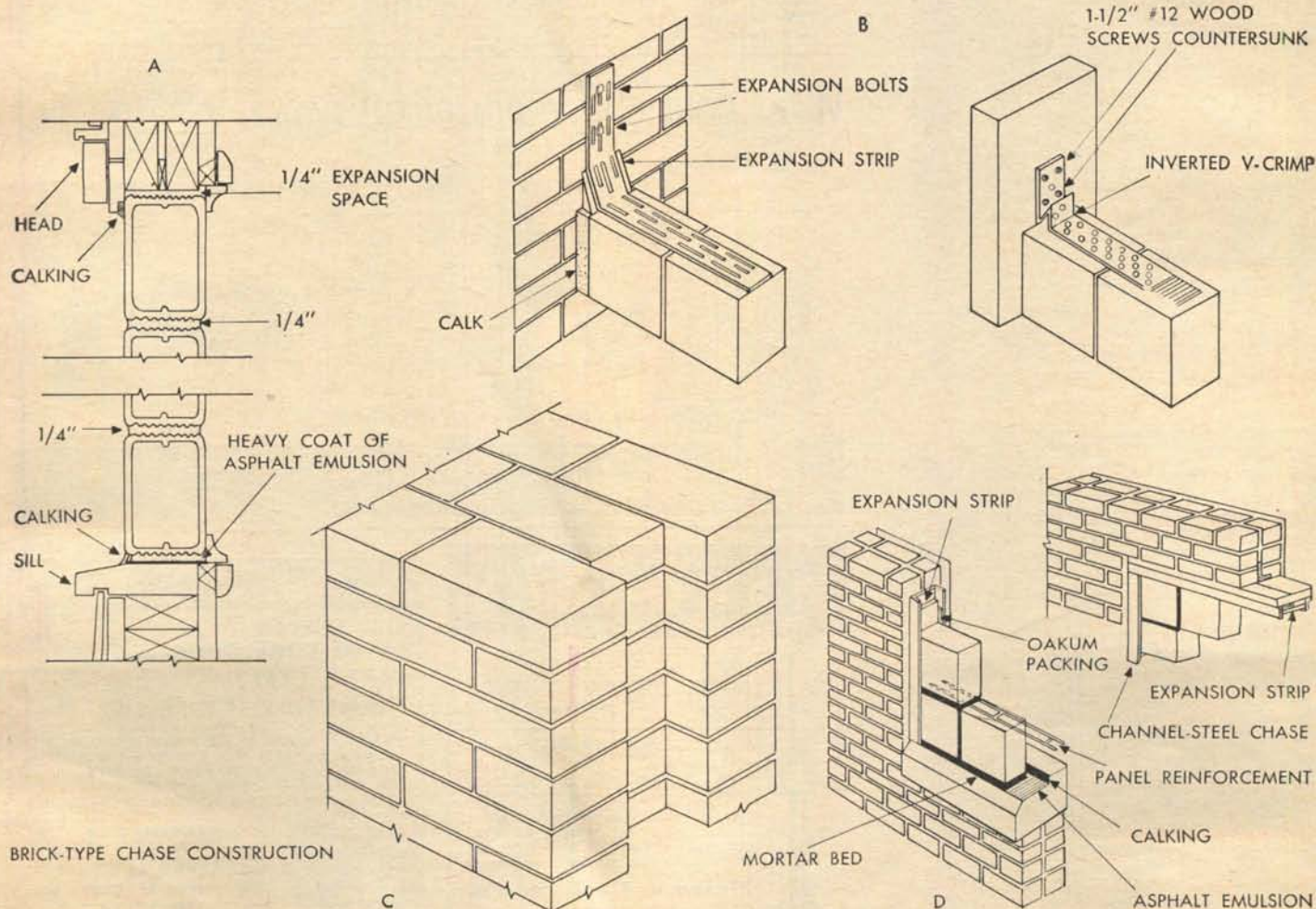
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Glass Blocks

MOREY SALVA

ARE THERE AREAS IN YOUR HOME THAT NEED MORE LIGHT, but where privacy must be maintained, such as in the bathroom? Fig. 5 shows how glass block can be used to solve that problem. The same solution will apply for a dark front entrance hall, where a vertical row of blocks beside the door will do the job. A horizontal row over the kitchen range will bring in the sunshine there. Glass block can be handled as easily as concrete block or brick, if you remember a couple of simple rules. Glass block must never be used to support a load. It must always be installed in a framework that provides support at the top and sides, as for a window. Fig. A shows the manner of installing glass block in a frame from which a window is removed. This panel must not be more than 25 sq. ft., nor more than 7 ft. high or 5 ft. wide. To figure the number of blocks required, measure the opening for multiples of 6, 8 or 12 in., the standard sizes for glass block. Make sure the opening permits $\frac{1}{4}$ -in. mortar joints, and allow $\frac{1}{4}$ in. free expansion space at the top and $\frac{1}{4}$ in. for mortar on the sill and jambs. (True di-





1. When working with chase-type construction, fit pieces of cardboard between the faces of the glass blocks and the chase. When the mortar has set completely, the cardboard is removed and nonstaining oakum packing is driven in, covered with calking.

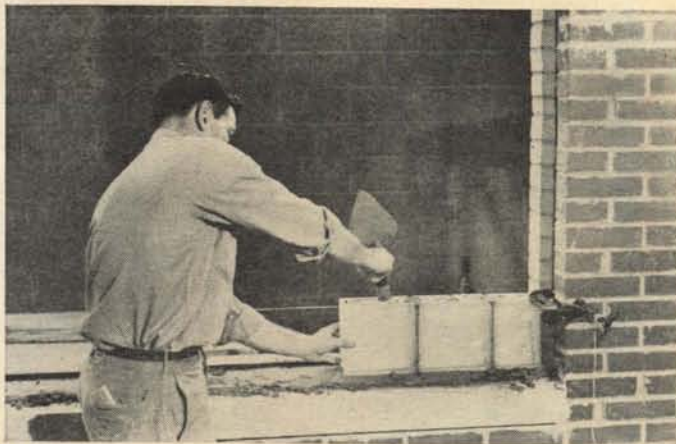


3. To assure full joints without voids, slightly crown the mortar as it is applied, as illustrated. Mortar should be quite dry, as glass blocks absorb no water as do bricks. Before mortar sets completely, compact it into all joints, fill any voids.

mensions of the blocks are $\frac{1}{4}$ in. less than given, to allow for $\frac{1}{4}$ -in. mortar joint.) Where a space will not accommodate the blocks exactly, the mortar joints can be made as little as $\frac{3}{16}$ in. wide, or as much as $\frac{3}{8}$ in.

Asphalt emulsion is applied to the window sill, Fig. A, allowed to dry, then a bed of mortar is troweled over it. The mortar must be quite dry, as glass blocks absorb no moisture, as do brick and concrete blocks. Mortar one edge of a block and place it on the sill, next to the jamb. The next block goes on the opposite side against the jamb. The last block installed is the center of each course. It may be necessary to push mortar into the final joint.

For larger panels either a chase-type construction, Figs. C and D, where brick or a steel channel provide the chase members, or reinforcement by wall anchors, Fig. B, are required. In new brick construction the chase may appear as in Fig. C, while a channel is required for existing structures, Fig. D. The chase is at least $4\frac{1}{4}$ in. wide and $1\frac{3}{4}$ in. deep. For panels of glass block over 25 sq. ft., expansion spaces are required at the sides as well as top. To prevent mortar entering the expansion spaces, expansion strips are placed in the chase, Figs. B. and D. After the block has been set in the chase, pieces of cardboard are placed between the faces of the block and the chase, Fig. 1. Welded galvanized wire mesh 2 in. wide is used for reinforcing larger panels, Fig. 4. The mesh cannot bridge expansion spaces and must lap 6 in. when more than one length is used. Chases cannot be used where the full faces of the blocks must show, and panel anchors are then used, Fig. B. When the



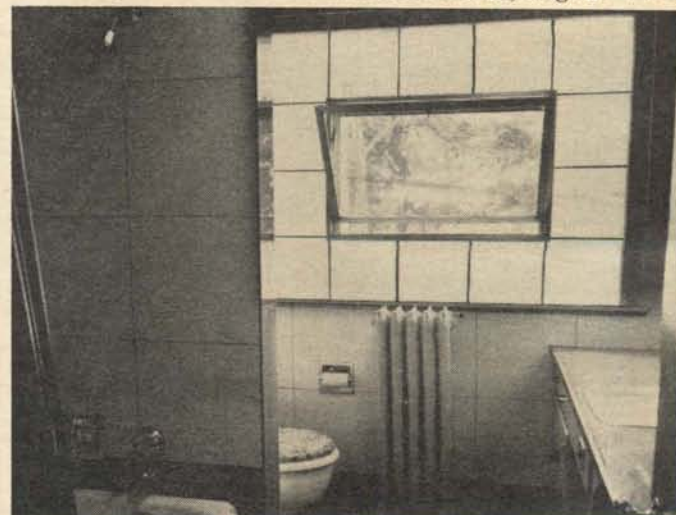
2. Use of guide string assures proper alignment of each horizontal course of glass blocks. A rubber crutch tip fitted over the end of the trowel provides a means of tapping the block into position with no chance of breaking them easily.



4. Panel reinforcing should never come in direct contact with glass blocks. As shown here the reinforcing is sandwiched between mortar bed between courses of block. When more than one piece of reinforcing is used, ends must overlap 6 in.

mortar has set, nonstaining oakum is rammed into the expansion spaces so it is $\frac{3}{8}$ in. back from the block faces. Calking is applied over it.

Properly crown mortar joints, Fig. 3 to make sure no voids are left, and tap the blocks into alignment with a crutch tip on handle of a mason's trowel, Fig. 2. $\triangle \triangle$



5. This is one example of how glass block can be used to provide light, yet assure privacy. Windows, such as shown here, are installed as block wall is built, provide ventilation. Glass blocks must never be used as members of a load-bearing wall.

1. Air conditioner installed in wall is neat, has "built-in" look. Problem of installing and removing from window are eliminated.

"Built-In" Room Air Conditioner

WARNER BENSON

ELIMINATE THE LABOR of installing and removing a room air conditioner from a window by installing it permanently in an exterior wall, Fig. 1. In this article we show the installation in a frame structure. Unless you are familiar with masonry work, we do not recommend you try installing the conditioner in a masonry wall. One possibility would be to install the unit under a window wider than the required opening. A wooden box could be installed in the wall and calked weathertight. The windowsill would provide a "header."

In the installation illustrated the conditioner was installed in a wall that overlooked the stairwell leading to the basement. Movement of air from open windows in the basement through the stairwell and out an attached garage handled the elimination of hot air discharged from the conditioner. All other factors of the installation are the same as though it were through an exterior wall.

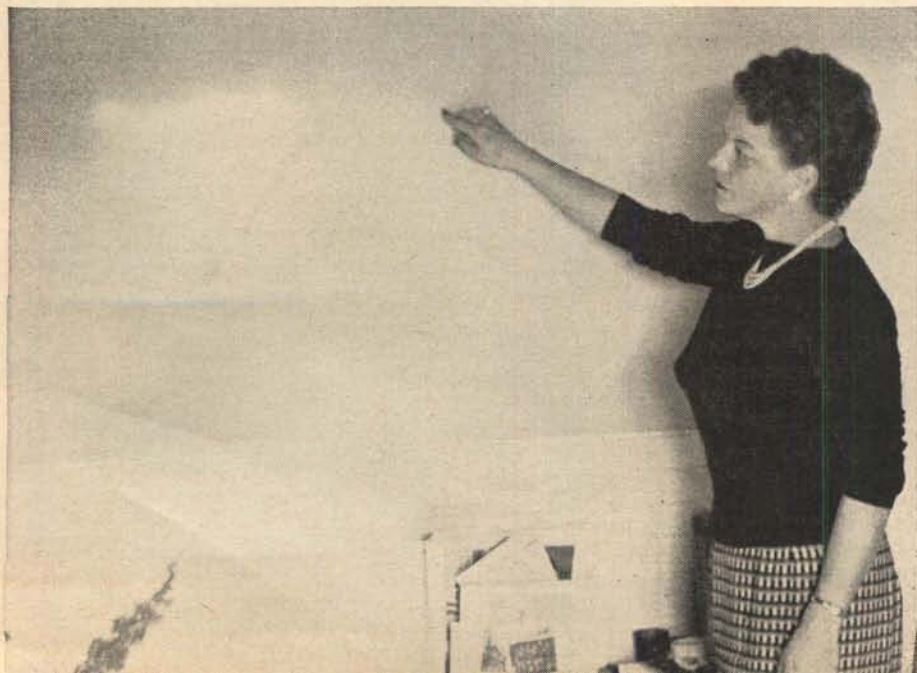
First step is to locate the opening for the unit, Fig. 2. Next, locate the

nearest stud and mark the width of the required opening. Cut away the wall material to the next nearest stud, Fig. 3, and of a height that will allow for a sill of 2-in. lumber and a header of 2 x 4s on edge. Cut out the center stud, square at the top, and with a slight downward angle to the outside on the bottom. Cut two lengths of 2 x 4 to reach from the sill plate up to the height of the cut 2 x 4, and spike them to the end studs. Next, install the sill of 2-in. stock, keeping the inner edge flush with the edges of the studding and nailing it to the three short 2 x 4s and toenailing into the outside

studs. Cut two lengths of 2 x 4 long enough to fit across the top of the opening for a header and spike them together. Nail two blocks on the end studs, so their lower edges are flush with the top of the opening. Now, toe-nail the header into the end studs and nail to the center cut-off stud. Finally, cut two lengths of 2 x 4 to fit between the 2-in. sill and the header and nail them to the end studs. The box is complete. Remove the air conditioner from its cabinet and fit the cabinet in the opening. Position it so the cover of the unit will just fit when the conditioner is in the cabinet. If the sill is slanted too much (as was the original installation, Fig. 5) so the front of the conditioner does not fit well, shim up the outside edge, as was done on the installation shown. Drill through the cabinet and attach it to the side, top and bottom of the opening with wood screws. Slide the unit into the cabinet for a final check. Use joint tape and cement and seal the wall to the cabinet, Fig. 4, and dimple and cement over any nails that have loosened in the wallboard. When dry, paint to match the walls, put on the cover and the job is done, Fig. 1. For winter protection, cover the outside of the conditioner with a box made of exterior-grade plywood, Fig. 6, sealed against the wall with a rubber gasket. △ △

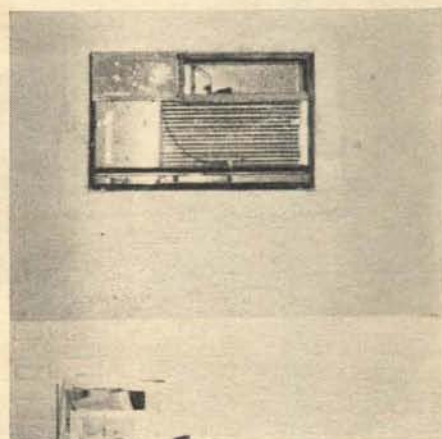
2. "I want it this high," says wife. "Cold air won't blow directly on us at table, yet controls are handy. It's high enough to clear furniture."

40 « WORKBENCH

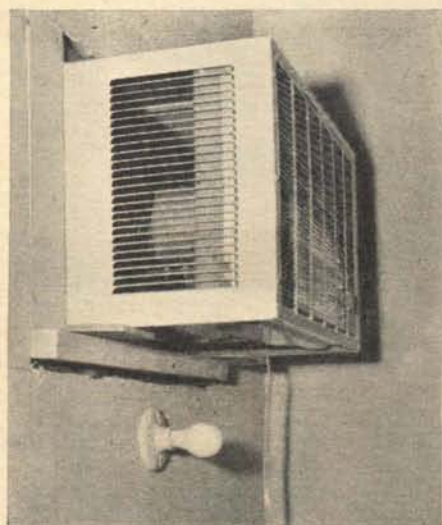




3. First step is to find stud, then cut away wall-board between two or more sets of studs. Insulation is removed, center stud is cut out.



4. After conditioner is fitted in place, joint tape and joint cement are applied around unit to seal opening. Nearby nailheads also require plaster.



5. Length of 2-in. stock is used for bottom of opening, two 2 x 4s on edge are used for header at top. Double 2 x 4s are at each side.

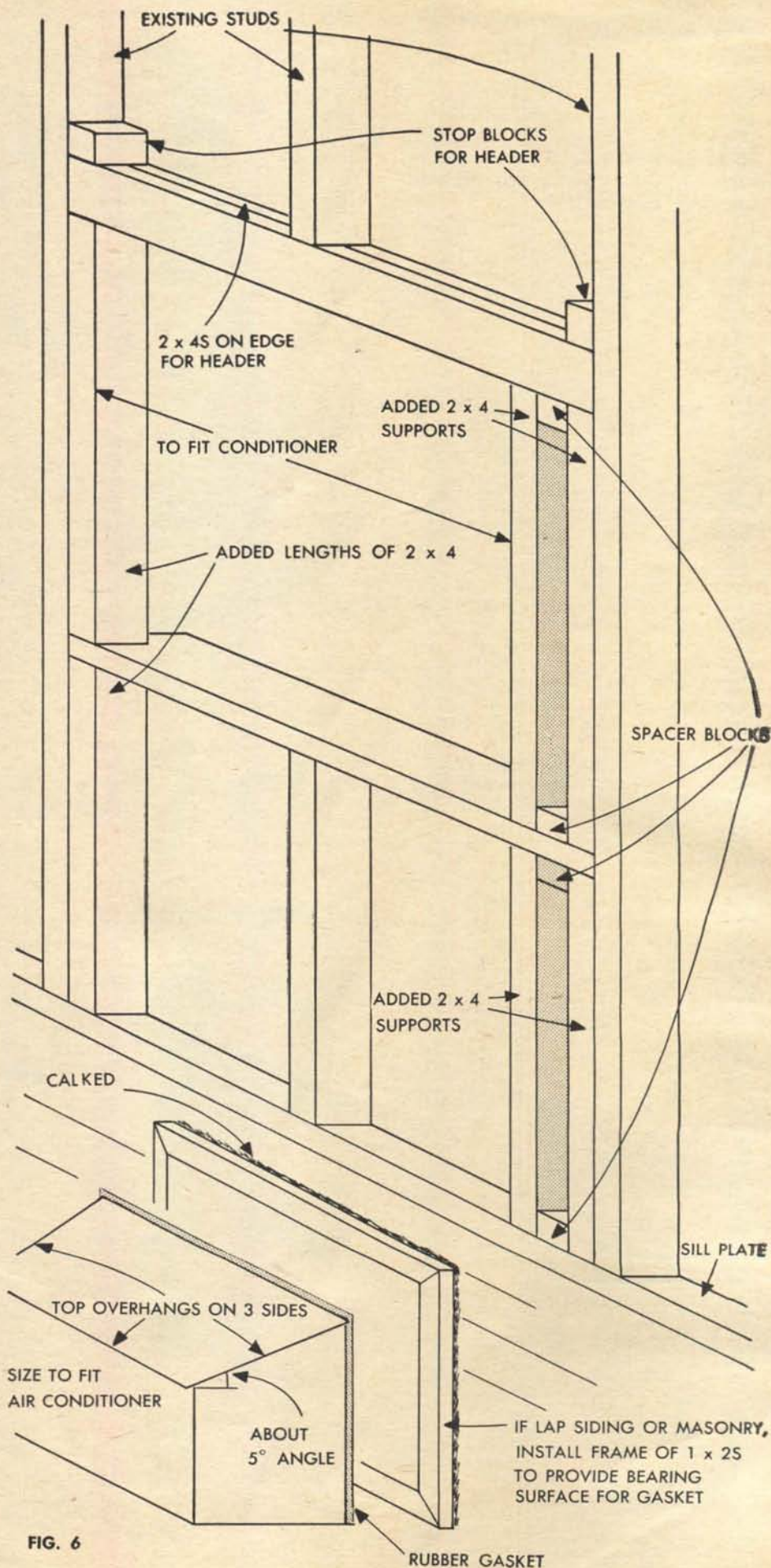


FIG. 6

Basic router has 4-amp. motor, turns 23,000 r.p.m., has all ball-bearing construction.



Five-In-One Router

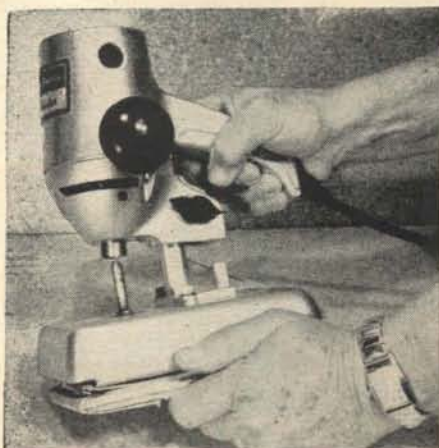
(Including a Bladeless Jig Saw)



1. "Bladeless" jig saw utilizes rotating bit in place of usual blade. Guide pin (inset) keeps bit aligned in kerf, overcomes effect of motor torque. Unit cuts very short radius.

MOST INTERESTING of the attachments for this 5-in-1 router unit is the jig saw, Fig. 1, that does not use the usual-type blade. In its place a rotating bit, appearing to be a modified drill bit, is used. Another unusual feature is the guide pin, inset, Fig. 1, that is required with this arrangement to keep the tool aligned in the kerf. Judging by appearance it would seem that the saw would not cut a very short radius. In actual use, however, the tool will cut just about as short a radius as any standard-blade jig saw we have tested in the Model Shop. Also, because of its drill-bit-like action, the blade makes the starting of pocket cuts as simple as boring a hole. The motor unit slips into the jig saw accessory and is held by a thumb nut. A collet chuck, Fig. 2, is used to hold the jig-saw bit.

The collet chuck also is used to hold router bits—more than 200 shapes and sizes are available—when the unit is used as a straight router, as in the lead photo. All ball bearings are used in the power unit, which turns at 23,000 r.p.m. This actually is somewhat slower than



2. Chuck is required for holding router bits, and for jig-saw bit, but other attachments simply slip in place, are locked with thumb nut.



3. Finishing sander can be used with, against or across grain. Has $\frac{1}{4}$ -in. orbit, rotates at 5,000 r.p.m. Fine for sanding end grain.



4. Plane handles any standard door, cuts so smoothly that no sanding is necessary, bevels to 30 deg., takes $\frac{3}{64}$ -in. bite on 2 x 4.

other router power units that have speeds of 26,000 to 30,000 r.p.m., but still much faster than most $\frac{1}{4}$ -in. drill motors that are used with various attachments. One safety feature we especially liked was the removable cord, Fig. 7. This eliminates the need for locking up the tool to keep it away from youngsters, and permits easy storage in a case or cabinet. The motor of the unit can be used with AC or DC current of from 25 to 60 cycles, which make it usable wherever there is electric power.

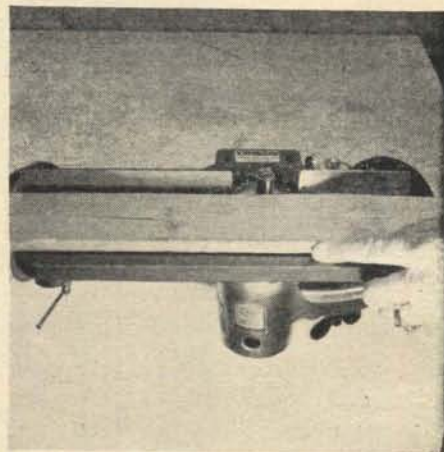
When used as a finishing sander, Fig. 3, the unit is geared down to produce 5,000 r.p.m. to the sanding face that has a $\frac{1}{4}$ -in. orbit. The sanding action is as effective as any orbital unit we have tested. When used with the sander, the motor requires no chuck; the hex-shape shank of the sander simply slips up into the hollow shaft of the motor. A thumb nut clamps the sanding unit to the motor.

When the unit is used as a plane, Fig. 4, the motor is held horizontally.

The plane cuts so smoothly that no sanding is necessary. It will cover the width of the edge of any standard door and will take a cut $\frac{3}{64}$ in. deep. Width of the cut is $1\frac{3}{4}$ in., which means the edge of a 2 x 4 can be planed. The plane can be beveled up to 30 deg. and the specially-designed narrow shoe helps prevent gouging.

Jointing and shaping are performed with the tool by fitting the power unit in a special table, Fig. 5. Pieces of stock too narrow and awkward for the router are handled easily on the table. Cuts $1\frac{1}{2}$ in. high, $\frac{3}{32}$ in. deep for jointing, $\frac{3}{4}$ in. for shaping. Ideal for truing stock that is to be edge-glued. Chucking and removing planer, router and jig-saw bits is simplified by the use of a pin, Fig. 6, that holds the armature. The flat top of the motor unit, Fig. 8, makes it easy to hold it on a bench top.

The 155 Router is available wherever Porter-Cable tools are sold. For more information write: Porter-Cable News Bureau, Marcellus St., Syracuse 1, N. Y. $\Delta \Delta$



5. When fitted in table, unit will shape narrow pieces too awkward to handle with router. Cuts $1\frac{1}{2}$ in. high, $\frac{3}{32}$ in. deep for jointing.



6. Pin is provided to lock armature when chucking or removing router bits, jig-saw bit. Pin is held conveniently in rubber clip on cord.



7. One of handiest features is removable cord. Makes storing of the tool especially easy, ends problem of cord breaking at handle.



8. Flat top of the motor permits it to stand upright on bench, simplifies use of wrench to loosen chuck for removal of router bits.



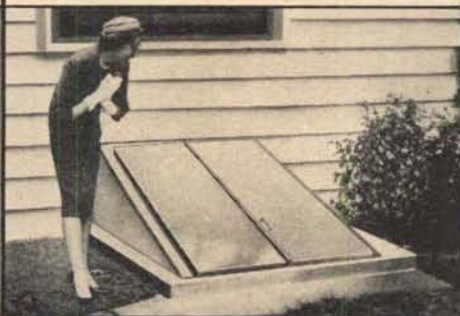
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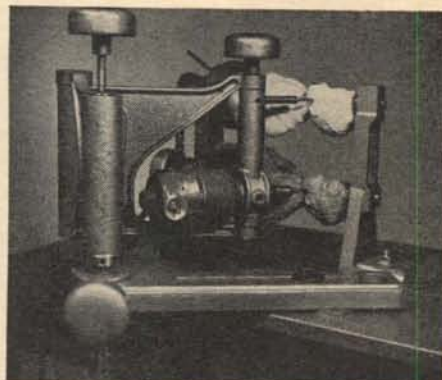
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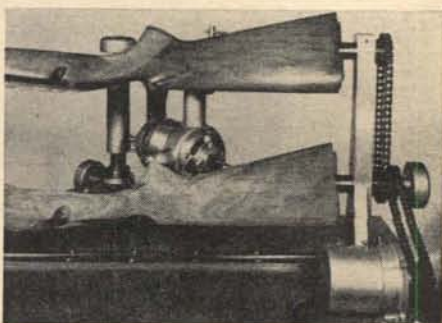
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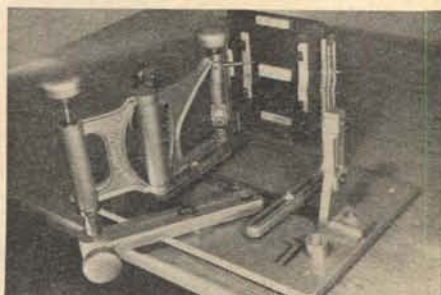
1. Ceramic bust is being duplicated by wood carving formed with tool in portable grinder.

3-Dimensional Duplicator



2. Some models, as here, have special motor that synchronizes rotation of original model and work blank.

POWER CARVING DUPLICATES in wood is no trick at all with the "Turn-O-Carve." The unit is available in a number of sizes and models, some having a motor that simultaneously rotates the model and the work-blank, as in Fig. 2 where a gun stock is being duplicated. Other models require rotation by hand, Fig. 1. This latter figure shows how a ceramic figure can be duplicated in wood. Portable hand grinders of various makes are used to provide power for the carving tools. Various jigs and fixtures permit duplicating bas-relief carvings, or making a solid carving from a pattern made of a number of parts, Fig. 3. For more information, write to address listed in Manufacturers' Directory. △ △



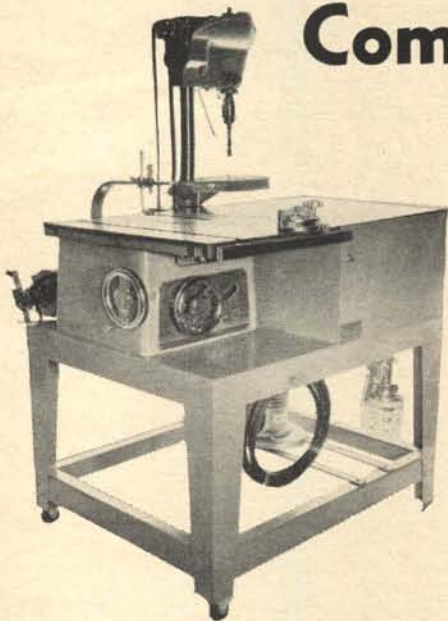
3. Jigs and attachments permit variety of operations with Turn-O-Carve, that can be used in lathe.



1. Manually-operated clutches permit driving each tool individually from the single, $\frac{3}{4}$ -H.P. capacitor motor.

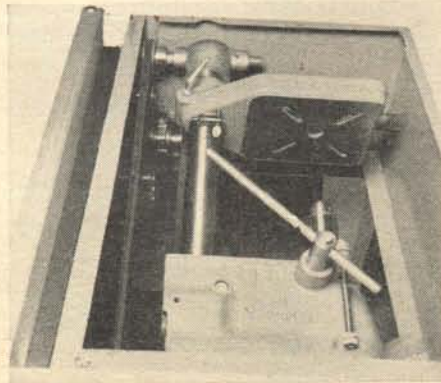
4-In-1

Combination Tool

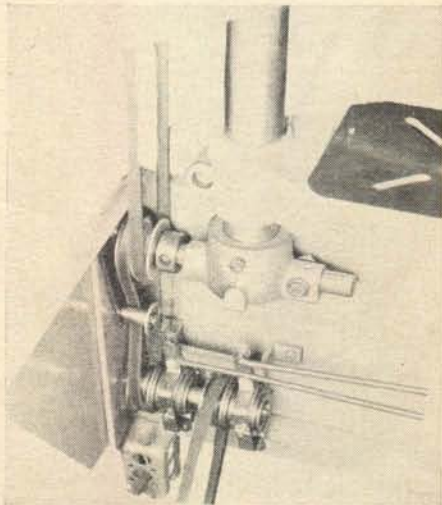


2. When the unit is used as a jig saw, that attachment is driven from table-saw arbor.

3. Drill press pivots down below worktable, leaves clear work surface measuring 29 x 36 in.



ANOTHER ENTRY in the field of combination tools is this unit, Fig. 1, that features a 9-in. tilt-arbor table saw, a 12-in. drill press, air compressor and jig saw and sander. The latter two units are driven by the arbor of the table saw. A large work area on one side of the unit is removable, so that it can be lifted off and the drill press swiveled down out of sight. Fig. 3 shows the manner in which the unit "disappears." Separate, manually-operated clutches are used to drive each tool, so that only one tool is operated from the single $\frac{3}{4}$ -H.P. motor. The control rods for the clutches are shown in Fig. 4. Fig. 2 demonstrates how a jig saw is driven by the table saw arbor. See Mfr.'s Directory for the maker's address. $\Delta \Delta$

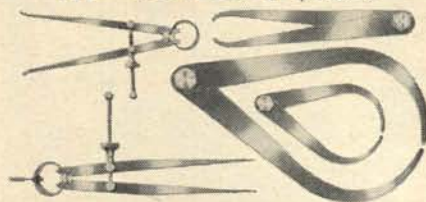


4. Shown here is method of pivoting drill press, control rods and clutches for driving each tool.

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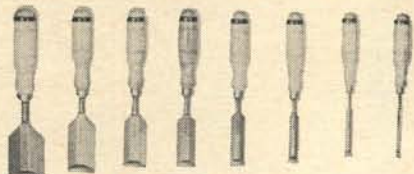
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Authentic in design, this model is a type of 'ricksha seldom seen in large cities anymore, and only occasionally in smaller communities.

THIS AUTHENTIC DESIGN of a "Jinkiksha," or "Kuruma," (wheel, as the Japanese call it), is patterned after a one-passenger vehicle rarely seen in big cities anymore, although a few are still in use in smaller communities far from cities.

All construction of the model can be done with a sharp knife, razor blade and model-airplane cement. Sides of the model are 1/16 in. balsa wood, thicker pieces are used for seat and back which may be covered with cloth. Shafts and top bows are bamboo of the sizes indicated, bent over a hot steel rod or light bulb. Fender brackets are 3/32 in. brass or steel rod, and the axle is the same stock. Make springs of metal cut from food tins and solder them to the axle. The folding top is optional. The bows should have the cloth cemented on before they are folded in a fixed position. The lower

Model Japanese 'Ricksha

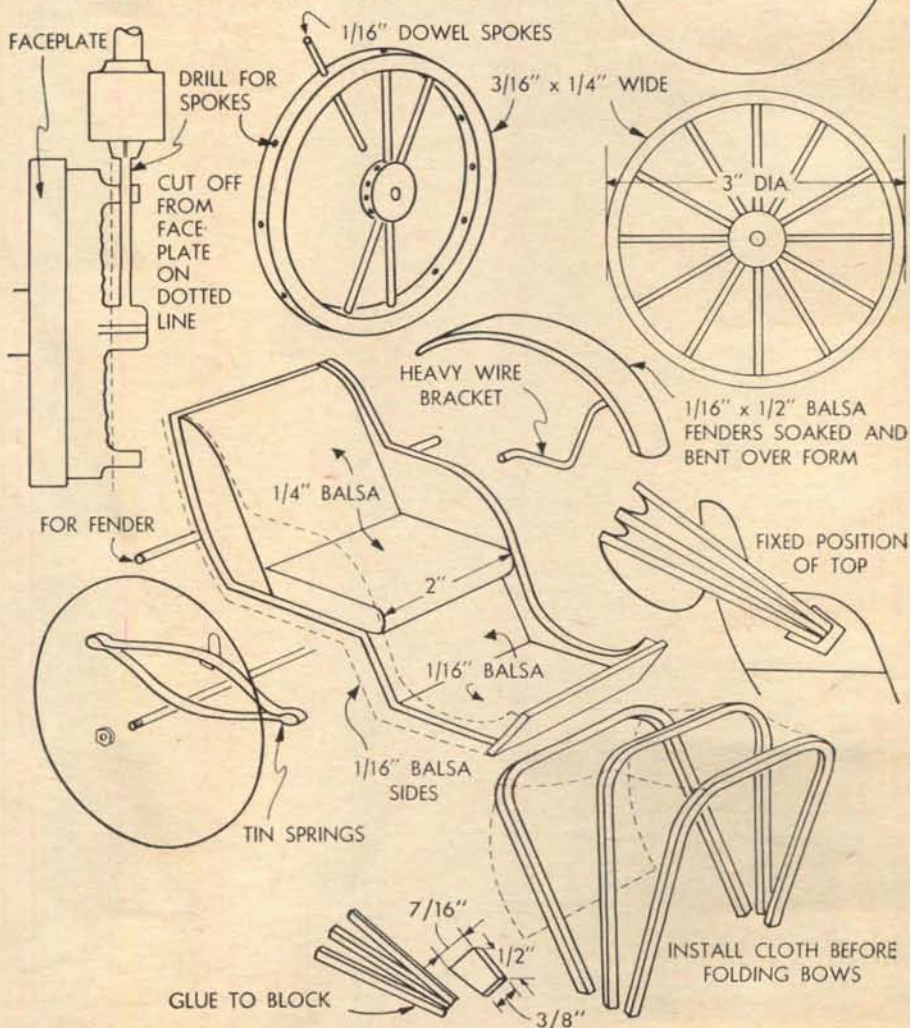
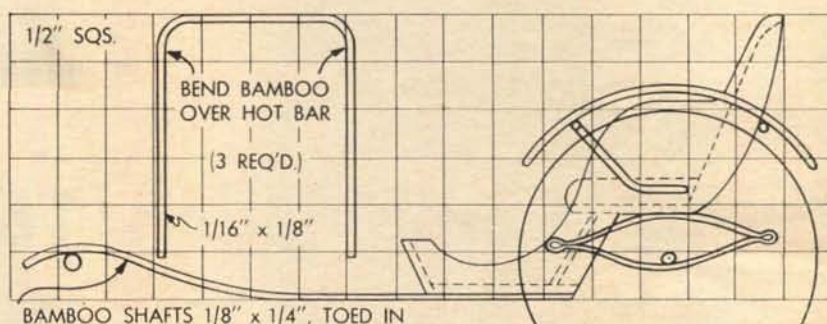
HI SIBLEY

(Former Tokyo resident)

ends of the bows are brought together on a block that is cemented to the body.

Trickiest parts of the model to make are the wheels. They can be made as faceplate turnings on a wood lathe, and drilled for the spokes

before cutting them off as indicated. With care the wheels should be fitted with spokes before being cut loose. If you have no lathe, wheels can be purchased from most hobby shops. Leave the model in natural-wood color, or apply black lacquer. $\Delta \Delta$



Major components of model 'ricksha are shown here. Third side member actually is paper pattern used to cut wood sides. Note spring tabs.

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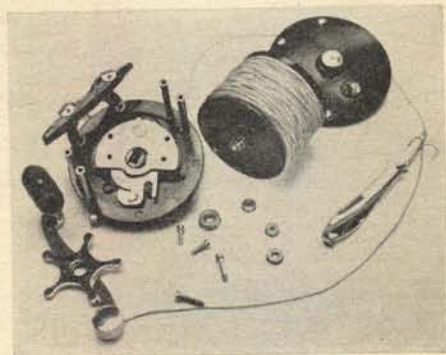
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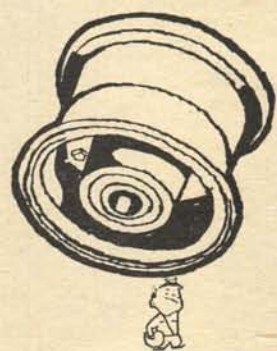
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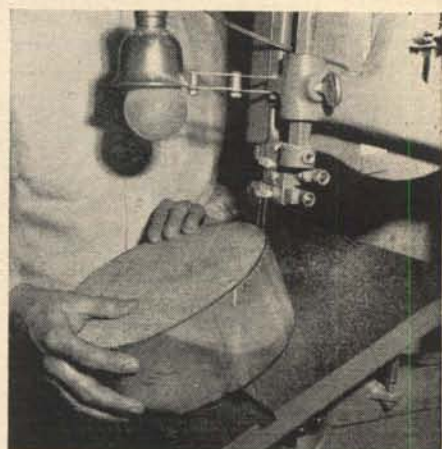


WOOD-TURNING SHORTCUT

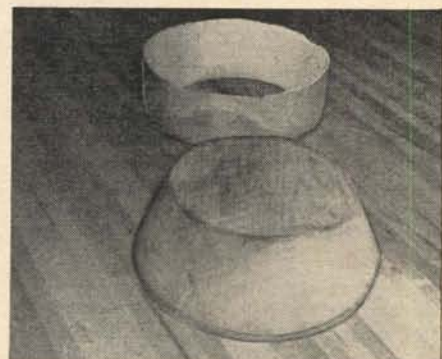
C. WAYNE CLOSE

MUCH OF THE TIME, labor and dust required and produced to rough-out most large faceplate turnings can be eliminated by a single bandsaw cut. The salad-bowl turning shown here is a good example of the type turning on which the bandsaw shortcut can be utilized. First, make a pattern or template of the finished outside contour of the bowl or project. Next, tilt the bandsaw table so that a bevel cut can be made to remove most of the waste wood outside the contour. Allow about 1/4 in. extra wood for truing up the blank in the lathe. If the bevel cut is made carefully, the blank will remain in balance. However, there is a chance that a light cut will have to be made to return the workpiece to balance when it is mounted on a faceplate.

Mount the work on the faceplate, balance it if necessary, then rough out the inside with a round-nose chisel. Turn the lathe at slow speed. Next, finish shaping the outside, then return to the inside and complete it. Sand the bowl carefully with 2/0, 4/0, 6/0 and 8/0 garnet paper. If the bowl is to be used exclusively for salads, finish the inside with mineral oil and the outside with clear lacquer. For other uses, finish inside and outside with several coats of lacquer and rub to a high polish with fine steel wool. This can be done with the bowl in the lathe. After the final smoothing, apply several coats of paste wax and buff to a high gloss with a soft cloth.



After determining the top and bottom diameters of the bowl to be turned, bandsaw the blank, allowing 1/4 in. for shaping.

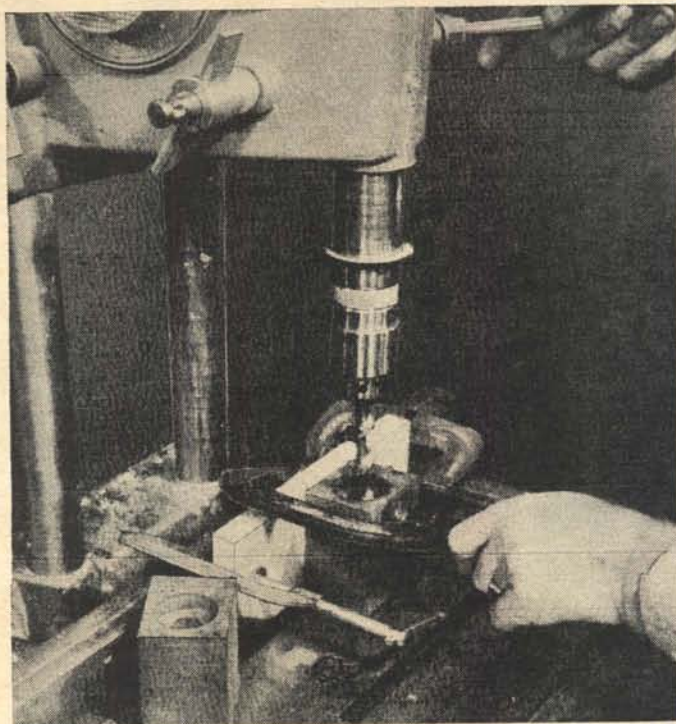


Here the bandsaw blank is ready to mount on the faceplate. Note the large amount of waste wood removed with saw cut.

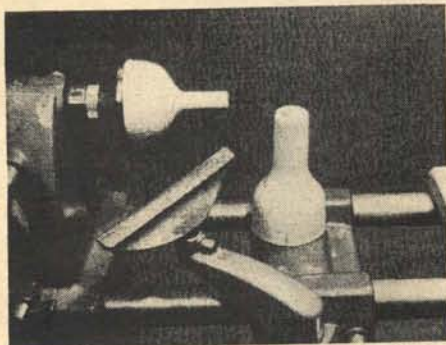


Inside of bowl is roughed-out first, to remove tensions that might cause edge-splitting. Bowl is being turned on outboard end of headstock.

PLUG-CHUCK TURNING



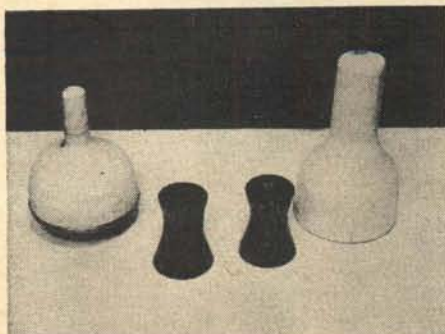
1. Use of plug chuck permits boring out salt and pepper shakers, other items, before turning, assuring concentric inner and outer surfaces.



2. Plug chucks are turned from scrap blocks, made in a variety of sizes. Each chuck is marked, used only with matching faceplate.



3. Edges of block should be smoothed with plane to reduce initial resistance to chisels, thus prevent it from slipping on the plug chuck.



4. Salt and pepper shakers shown were turned with aid of smaller plug chuck at left. Items were turned, smoothed, finished on chuck.

ELIMINATE THE PROBLEM of center-boring difficult-to-hold turnings, such as salt and pepper shakers, by drilling the items before chucking them in the lathe, Fig. 1. The type chuck used to hold the work is called a "plug chuck" and is made to fit each workpiece. The chuck is turned from a scrap block of wood, and consists basically of a slightly tapered "mandrel," Fig. 2. The workpiece is then is forced onto the chuck, Fig. 3, and is held by friction. Each chuck—you will need a variety of sizes—should be marked so it can be replaced in the same position, and always on the same faceplate. Workpieces can be turned, smoothed and finished on the chucks, Fig. 4. Plane off the corners of the workpiece to reduce initial resistance to chisels. $\Delta \Delta$

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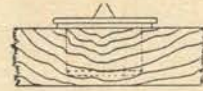
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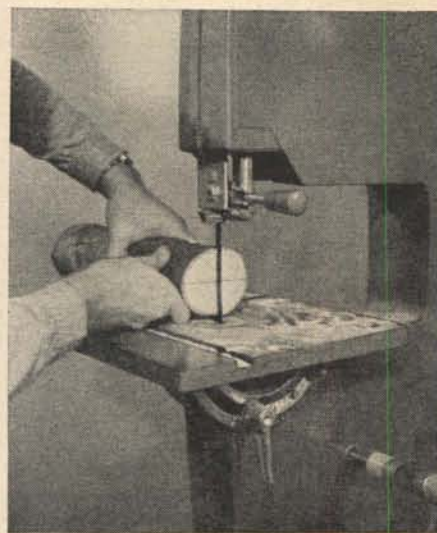


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1. There is very little similarity between the lengths of bark-covered firewood and the graceful candlestick, but it was from such a well-seasoned log that the turning was made.



2. Quick way of marking the centers of a log is to "X" ends with handsaw or bandsaw.

Firewood Turnings

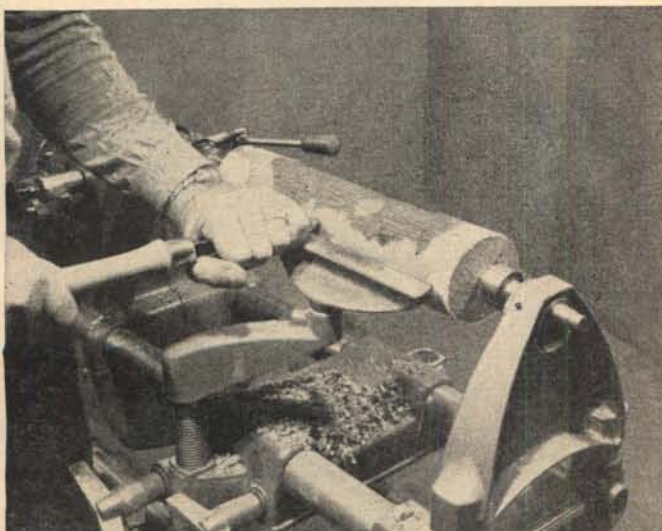
CLIFFORD AND PAULINE REIDY

WHEN YOU ARE LOOKING for stock to make lathe turnings it might be a good idea to look in your woodpile, if you have a fireplace that requires cordwood. Pieces of walnut, oak, birch and other hardwoods often are included in wood delivered to your home. If you have no fireplace, keep your eyes open around the neighborhood for trees that are cut down for one reason or another. Salvage lengths of trunks and limbs that are

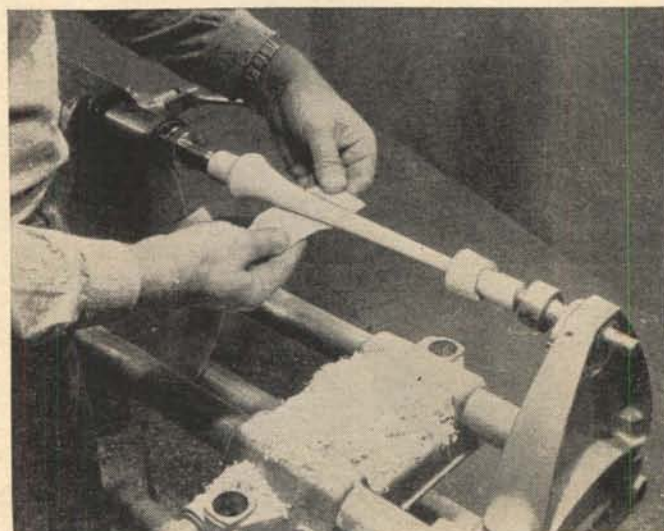
of a diameter that can be handled in your own lathe. Be sure the wood is dry and seasoned. Keep it outside for a season or two, stacking it so it drains well. An unheated garage is a good place for seasoning such lumber. When using the stock, mark the approximate centers of the ends, Fig. 2, with a handsaw or bandsaw. Chuck the stock in the lathe and turn it at slow speed until the bark has been removed and the stock is rea-

sonably round and balanced, Fig. 3.

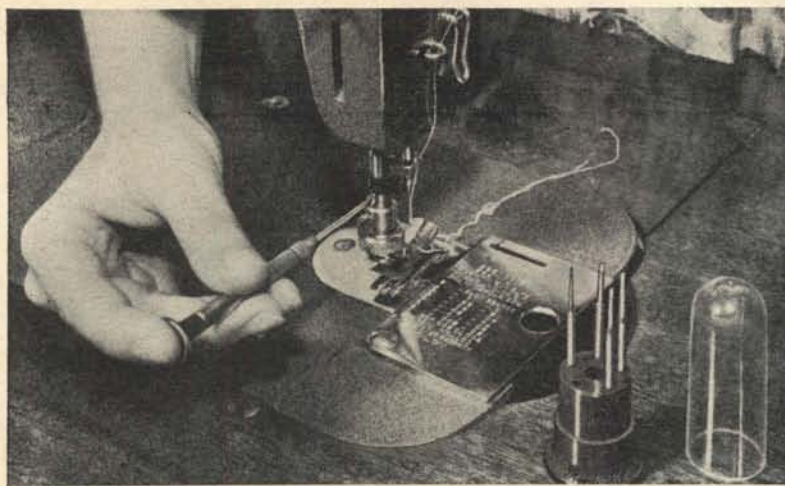
When you have reached this stage of the turning, it can be handled as any other piece of lumber. It can be smoothed, stained and finished, Fig. 4, while being rotated in the lathe. A candlestick is the project shown, Fig. 1, but bowls and other shapes with beautiful graining can be turned from firewood and salvaged parts of tree trunks and limbs that have been seasoned thoroughly. △ △



3. When you start turning log, run lathe at slow speed until the bark has been removed and stock is reasonably round so it runs true. Speed of turning then can be increased. Be sure wood is well-seasoned and dry.



4. As when using any other stock, turning from log can be sanded smooth, stained and polished while rotating in lathe. Worm holes, as in base of candlestick shown in Fig. 1, will add character.



Working on machines with tiny components, such as sewing machines, is a problem with normal-size tools. These miniature tools are ideal answer.

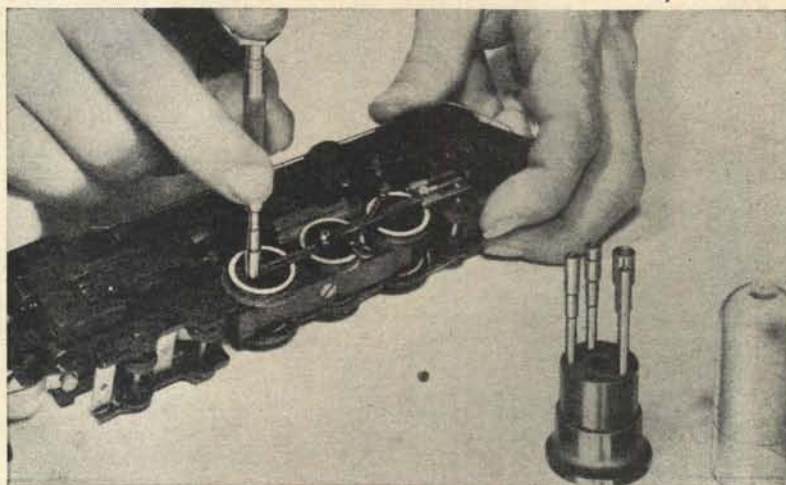
Miniature Tools

MINIATURIZATION IS MORE than just a new word in our language if you are a sportsman, hobbyist or home craftsman. Undersize screws, nuts and bolts are as close as your wife's sewing machine, on your fishing reels and on handguns, rifles and shotguns. Regular-size tools are just too big to handle these tiny parts; the answer is miniature tools for mini-

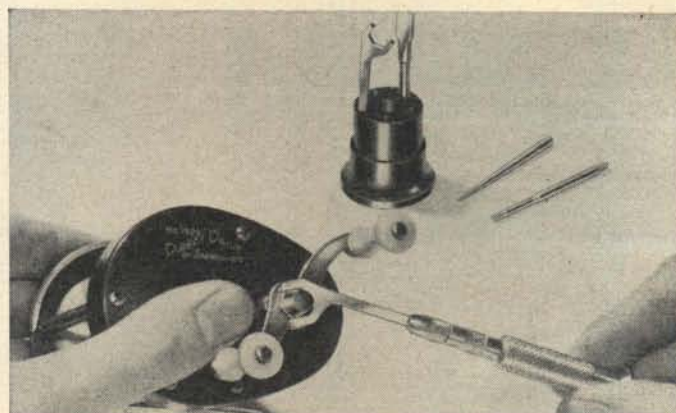
ature parts. Screwdriver sets in small size utilize one handle to grip several sizes of blades. Scaled-down socket wrenches readily fit scaled-down nuts and bolts, eliminate the use of pliers that chew up the fasteners, never really tighten them properly. If you are a skier a tool just 4 in. long is a screwdriver and holder for wood plugs and spare

screws for making those emergency repairs out on a snow-covered slope.

Shown and described are just a few of the many types of miniature tools available. At least one, and possibly several of the tools should be in every craftsman's shop. For more information write to the Moody Machine Products Co., Inc., Providence 5, Rhode Island. $\Delta \Delta$



Hollow handle of this tool holds wood plugs and screws for repairing skis. Available with straight blade or one to fit recessed-cross slots.



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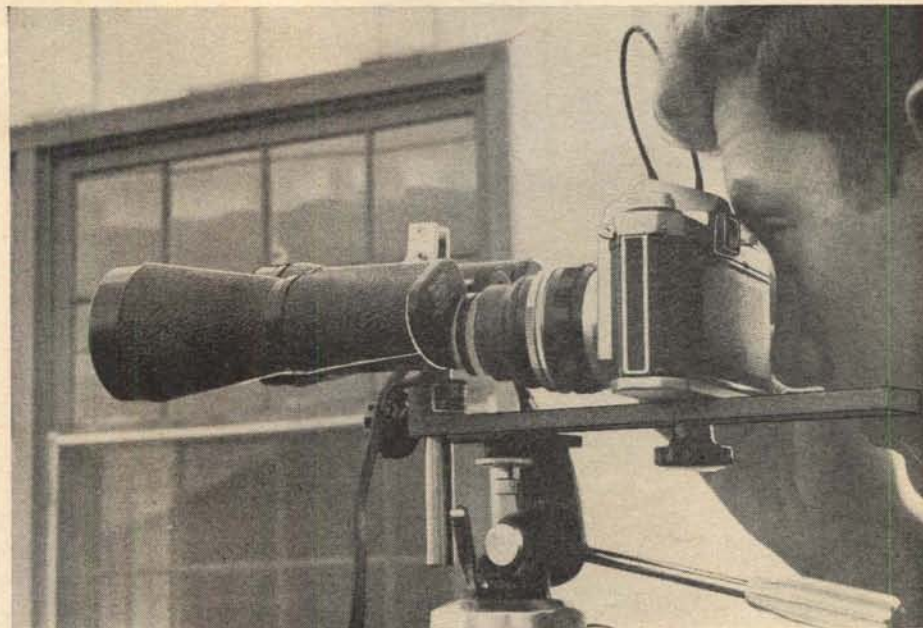
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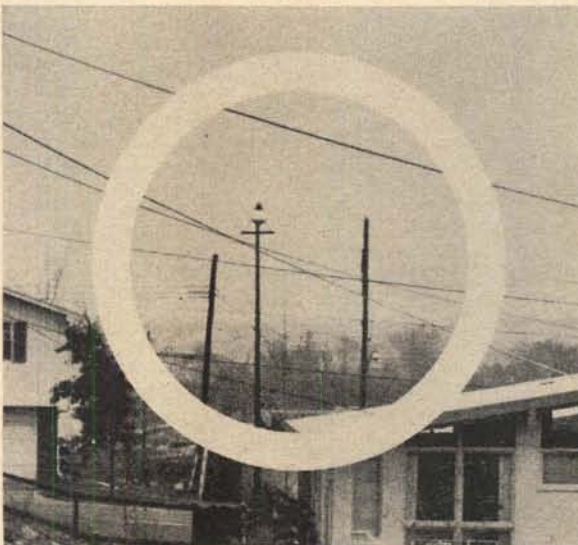
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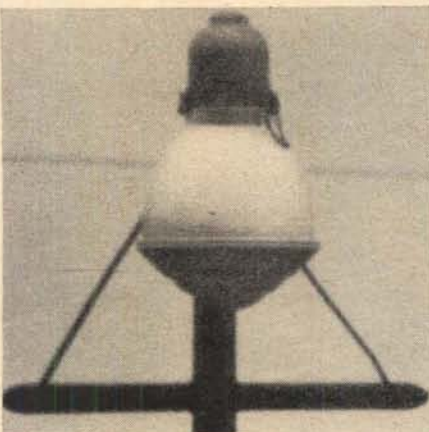


Single-lens reflex Asahi-Pentax 35 mm camera is shown being used on adapter with 25 x 50 binoculars. As with any telephoto lens, camera requires tripod.

Camera-To-Binocular Adapter



Subject shot with aid of binocular on adapter was street light several hundred feet away. Note that day is overcast, light value is low, but fairly uniform and shadow-free.



Some lack of sharpness can be noted in this shot taken through binocular. The greater the magnification, generally, the poorer the resolution.

RENTING A TELEPHOTO LENS is the usual answer for photographers who only occasionally have need to make long-distance shots. If you own a pair of binoculars, even that inconvenience can be eliminated by the use of this binocular-to-camera adapter. In our test we used a pair of 25 x 50 glasses from the United Binocular Co. on a 35 mm camera. (The adapter can be used with almost all sizes and types of cameras.) Instructions with the adapter explain how to figure the effective focal length of the combination of the camera and binocular lenses, and how to adjust your settings to compensate. Some modification of the adapter is required when it is used with press-type cameras. The unit is sold by Edmund Scientific Co. See Mfrs.' Directory for address. Δ Δ

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Johnsonmobile

DESCRIBED BY ITS BUILDER as having a body design incorporating features from early Oldsmobiles, Fords and Stanley Steamers, the Johnsonmobile is powered by a 3 HP gasoline engine. The speed is about 20 m.p.h., with gasoline consumption being so low that better than 50 miles per gallon is average. The starter for the engine is a pull rope, the handle projecting from below the front of the seat. An automatic clutch provides no-shift driving, the only controls being an accelerator pedal and a brake pedal that actuates 4-wheel brakes. A 6-volt electrical system powers the lights. Wheels are heavy-duty tandem-bicycle units with pneumatic tires.

Body of the car is plywood, metal is used for the fenders. Seat cushion and back are upholstered with foam rubber. Engine repairs can be made by any hardware store or garden center that repairs lawn-mower motors. Only carpentry is required for body work and any cycle shop can handle wheel and tire problems.

Cost of the car is about \$750, delivery requires about 6 weeks. Horton Johnson, Inc., 186 Hazel Ave., Highland Park, Illinois. Δ Δ



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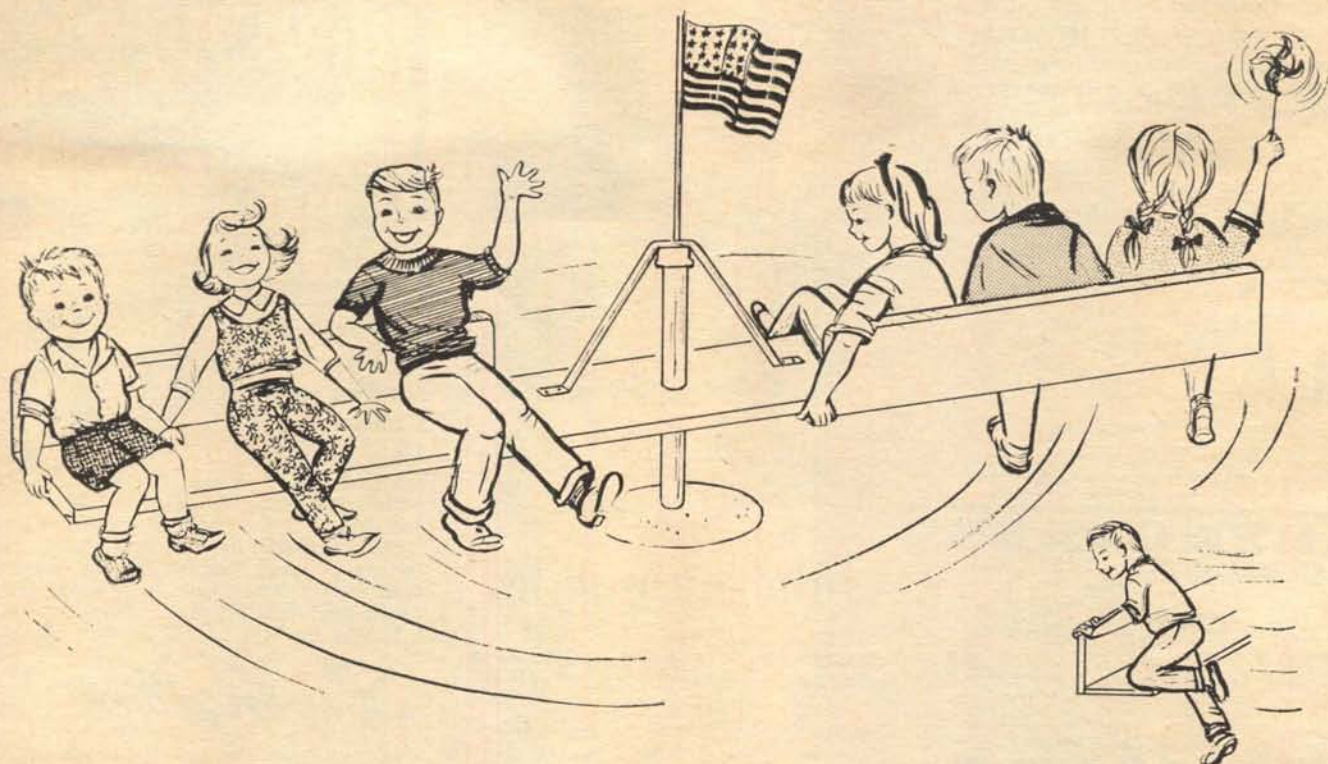
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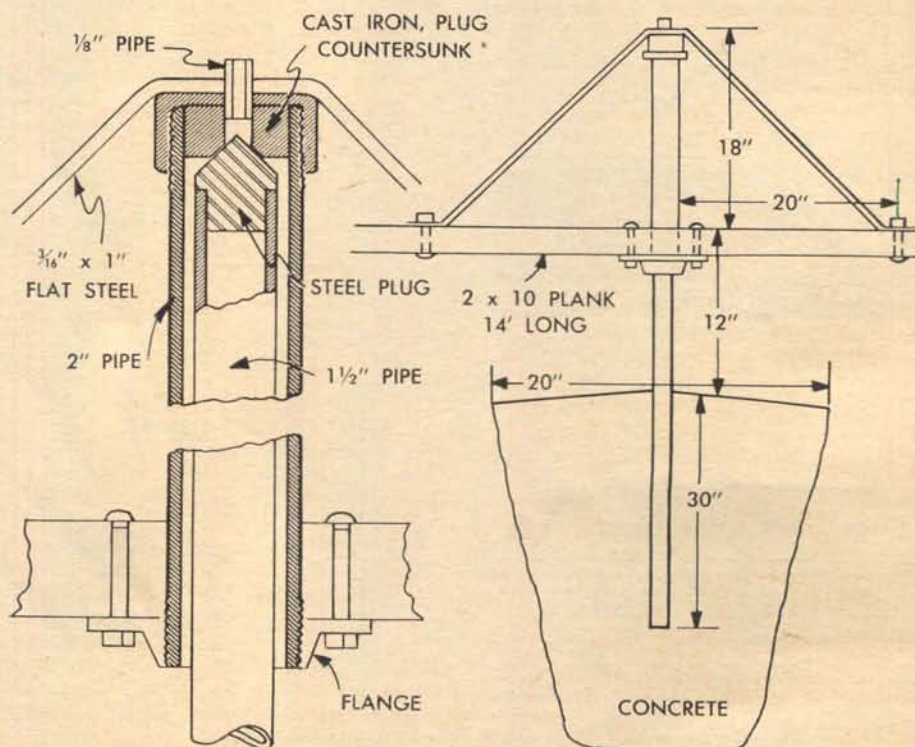
MAY-JUNE, 1961 » 53



Six - Place "Kick - Around"

YOUR YOUNGSTERS, (and the neighbor's, too), will have hours of fun on this novel "kick-around" because it is rugged enough to handle six or more riders at once. The entire load on the device is carried on a steel point, easily lubricated, so the unit rotates with the slightest push. Even a single child can ride it without the plank sagging or the center-post bearing binding.

Set the center pipe in concrete, after fitting a steel plug in the top beveled at 45 deg. Next, install a cast-iron plug with a matching countersunk in the outer pipe, weld in place and cover with a pipe cap, as indicated. If you have no metal-turning lathe, the two plugs may have to be made at a local machine shop, or perhaps a friend who has a lathe will do the job for you. A hole is drilled through the cap and plug and it is tapped to receive a short length of $\frac{1}{8}$ -in. pipe. This will permit oiling the bearing, or a grease fitting can be installed to permit using a grease gun. The 14-ft. plank should be straight-grained pine, fir or spruce. The back boards are 1 x 6s. A pipe flange is fitted on the outer pipe and attached to the plank with carriage bolts. Height of the plank above the ground is governed by the size of the children who will ride on the kick-around. $\Delta \Delta$



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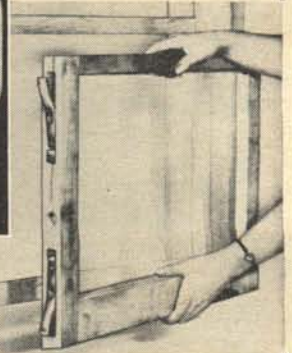
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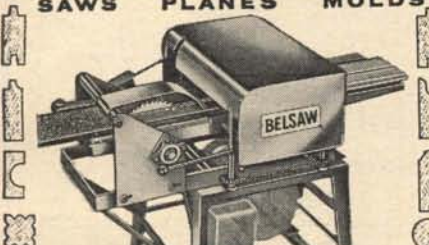
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WORKBENCH

RESEARCH DEPARTMENT

EACH ISSUE IN THIS COLUMN WE WILL CHOOSE QUESTIONS ON HOME AND SHOP SUBJECTS FROM LETTERS SENT TO US. ONLY THOSE QUESTIONS WHICH HAVE WIDE APPEAL WILL BE ANSWERED HERE. QUESTIONS ON SPECIALIZED SUBJECTS WILL BE ANSWERED BY INDIVIDUAL LETTER FROM THE RESEARCH EDITOR'S DESK.

Dear Research Department:

A few months ago we moved into a home that in general is in good condition. There are some odds and ends to fix, of course. Would like to ask your advice on one problem we have: the family room is on ground level and the floor is covered with asbestos tile. Five or six are damaged and must be replaced, and there are a like number that have buckled up a bit and need pushing back into place on the floor. We found enough tile of the same design to replace the broken pieces, but not enough for the buckled ones, too. Therefore we would like to be sure of what we do, for if we make a mistake we've got to start looking for tile to match. How would you go about this job?—Mr. W. W., Alabama.



Dear Mr. W. W.:

We think you will agree, after you have finished the job, that replacing damaged tile is relatively easy. You will need, if you don't already have, a propane torch, a linoleum knife (any hardware store has this) and about an hour's time, plus, of course, the tiles. To remove the broken tile, first cut around the edges with the linoleum knife, down to the level of the sub-floor. Next play the flame of the torch all over the tile to be removed. Use a medium flame to warm the tile thoroughly. This will soften the adhesive underneath. To

remove the damaged section, use a pick or other sharp-pointed tool and lift out. Or you might wish to try a "plumber's helper" and pull it up with suction. Remove all pieces of foreign material from the adhesive so that it is clean and smooth. Then reheat the adhesive and the underside of the new tile and set in place carefully. Push down firmly.

On your buckled tile, the procedure is much the same but there is less to do. Using your propane torch, heat the tile surface gently in order to make the tile pliable and to make the adhesive underneath sticky. Then with pressure force the high spots down in place.

Dear Research Department:

Recently I obtained some metal filing cabinets that are in excellent mechanical shape but there are several chipped spots and these spots have started to rust. I am planning to use spray can paint in a hammertone finish to redo the whole cabinet. What is the procedure I should follow in order to completely mask the bad spots?—Mr. A. R. S., Washington.

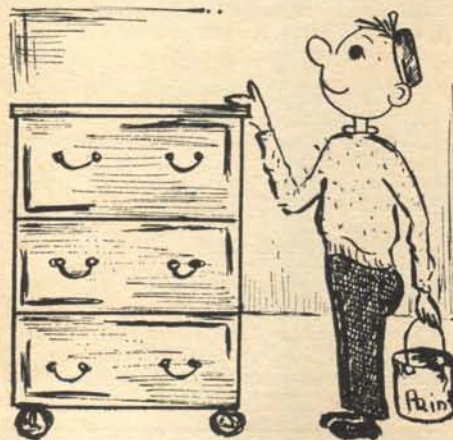
Dear Mr. A. R. S.:

Removing the evidence of chips and mars on your metal cabinets before refinishing, if done carefully, will result in a near perfect job with no telltale depressions to mark the previous bad spots. Here's how: any finish, such as wax must be completely removed. Strong soap and hot water is one way. Next you must remove all rust. Using a "medium" sandpaper, sand the area well—and sand an area somewhat larger than the damaged area. Continue this until it is clean and shiny. Now comes "feathering" into the surrounding painted area. For this step, we would advise a very fine "wet or dry" sandpaper. Use soapy water with this paper. Work all around the edges so that when you finish you cannot feel where the paint stops and the shiny metal begins. The more

careful you are at this point, the better the final results. Don't be afraid to work back from the bare metal, for the larger the area around the spot to be repaired, the flatter the pitch. When satisfied, dry the area very carefully. Apply a metal primer to all bare metal. Allow to dry overnight. This primer can be obtained in spray cans, too.

When this primer coat is dry, you are ready to put on your hammer-tone finish, after completing one more step. Again using a very fine grade of wet sandpaper and soapy water as a lubricant, sand the entire patched area for final smoothness.

It would be well to go over the whole cabinet at this time with this fine sandpaper to scuff up the surface to promote better adhesion of the final finish coat. When finished, dry very carefully before applying lacquer or enamel. You didn't mention whether you were using enamel or lacquer for your finish coat. In either case, apply the finish coat lightly to minimize the possibility of runs. If you are using enamel, the job is completed; if lacquer, wet-sand with a superfine wet sandpaper and follow up with a furniture rubbing compound. Such a rubbing compound is made using rottenstone mixed with paraffin oil to a thick paste. Apply it with a soft rag and rub to a gloss. Clean with furniture cleaner. The only point needing emphasis is that there is no short cut to the hand work involved: the care in following each step reflects directly on the perfection of the finished job.



Dear Research Department:

I have an old (but not antique) three-drawer chest that must have at least a half dozen coats of paint and varnish on it. The finish is in good condition as far as the paint finish is concerned—no checks or chips—but I wish to lacquer it and brighten it up with some stencil designs or decals. Now I find

that I cannot apply lacquer over enamel or varnish without having the undercoats "bubble" up, I think I was told. Is there nothing short of the very tedious job of removing all this paint and re-finishing the wood before I lacquer? I like the chest, and think it would be attractive fixed up as I plan, but I am afraid it's going to the basement as-is if I must go to this much trouble. Do you have any suggestions?—Mrs. M. R. K., Michigan.

Dear Mrs. M. R. K.:

The advice that you have received, up to a point, at least, has been correct. But I think there is a way out for you without relegating the chest to storage and eventual scrap heap.

Lacquers have a base that is composed of one or more strong solvents, such as benzol or solvent naphtha. It is this base that "bubbles up" any varnish or enamel undercoats that might already be there. This much is correct, and if the finish were checked or chipped, we would have to advise removing all previous finish and starting from scratch. However, you mention that the finish is satisfactory. We would first suggest, then, that you carefully sand all of the surface to make it perfectly smooth (as you would want it in the finished state). Then the trick is to provide an effective seal on top of these old coats of paint and thus prevent the "bubbling up" which is a softening of the paint by the lacquer solvents. If you can produce such a seal, why then you can put whatever you want on top.

Such a seal can be accomplished by brushing on a coat of shellac. Allow to dry for a day or two, and you are ready to apply the desired lacquer finish. A word of caution: brush the shellac on carefully and avoid leaving any brush marks for it is better not to sand the shellac finish for fear of cutting through. If this happens, the lacquer solvent may get at the paint and soften it.

Dear Research Department:

At a farm auction recently, I purchased some antique fire tongs and several hinges, hand forged. They are rusty. How can I best refinish iron? This is a question I have had for some time and this recent purchase prompts me to ask advice. I have heard that there are several finishes, such as "antique," "dull black," etc. Are these finishes available at paint stores or is there more of a procedure to follow? Could you list any iron finishes you know of, and how to produce them?—Mr. D. M. L., Massachusetts.

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Dear Mr. D. M. L.:

Finishing iron is interesting, not particularly hard, and produces results that often are very pleasing. We will tell you of four such finishes and how to produce them, although only one or two would be applicable to the fire tongs. You might, however, use any on the hinges or garden furniture or other iron bric-a-brac you might have.

First is the "dull-black finish." This is normally used for small, decorative objects—for instance, your fire tongs. First clean the iron with kerosene or gasoline. Apply two or three coats of flat black paint, and allow each to dry. Make sure that the paint is well brushed out, dilute with thinner if it becomes heavy. After the last coat has thoroughly dried, apply several light coats of beeswax, and polish.

On such finishes as hammered iron or wrought iron there is another finish that might work nicely called the "half-polish finish." In producing this finish first rub the article with No. 0 emery cloth to a semi-polish. Clean the iron as mentioned above with gasoline or kerosene and paint it with two coats of flat black paint, thinning if necessary. Let dry thoroughly. Then rub the surface again with emery cloth until it is bright, but with black paint still left in the crevices. Here personal preference can enter for the amount of rubbing with emery cloth will determine the contrast obtained. When you are satisfied with the finish, apply two or three light coats of beeswax as before, allowing fifteen minutes or so between coats so that the beeswax will dry thoroughly.

Often a "natural rust finish" is desirable. It is also easy to produce. First the rust must be produced, artificially if necessary. This can be done with applications of a concentrated salt water brine or more rapidly, but not recommended due to its hazard, with diluted hydrochloric or sulphuric acid. Unless you are used to working with such acids,

we strongly recommend that you do not use them, not only from the danger of getting them in your eyes, on hands or clothing, but also because they are difficult to dispose of safely. At any rate, after you have your rusty surface, wipe it lightly with beeswax and polish it slightly.

The final iron finish in which we think you might be interested is called a "polychrome finish." It is especially appropriate to ornamental articles and it has many variations.

First, apply two coats of flat black as previously mentioned. Then paint any ornamental objects on the iron-work, such as rosettes, leaves, hinges, rivet heads, with your choice of one of the colored lacquers. Several colors may be applied to provide harmony, if desired. Another color that looks well on a polychrome finish is gold. There are two ways of application: all over an object such as a rivet head; or indefinitely, on edges or parts of surfaces. In the latter case, after you have applied the gold, wipe it with a dry cloth so that it looks to have run out. Another system of gilding is to wipe the gold color on all over, then wipe off in places, to let the black and colors, if any, show through. Perhaps one of these methods will be the answer to your problem.

Zone Your Mail

If you live in one of the 106 cities in the United States which use delivery zone numbers for mail delivery, please include your zone number in all correspondence with WORKBENCH. And wherever you live, your mail will be delivered faster to correspondents in those 106 cities when the address includes the zone number. Ask your correspondent for his zone number. A zone number is part of the address, specific, easy to read, simplifies handling and speeds delivery of mail. Ask your local post office if your city is one of the 106 which use delivery zone numbers. If it is, ask for your zone number. Use it on printed stationery, cards, advertisements and in your return address. The zone number of WORKBENCH is 11. So our complete address is WORKBENCH, 543 Westport Road, Kansas City 11, Missouri. Remember: You get better mail service by using zone numbers. Zone all mail.

IN THE NEXT ISSUE . . .

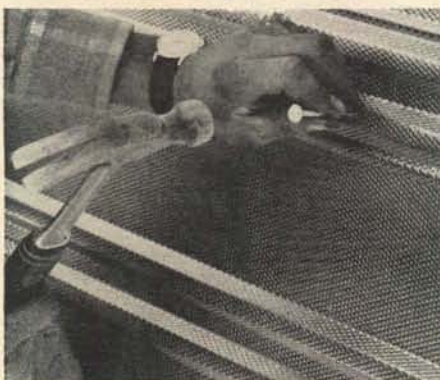
Build a Barrel Barbecue
60-minute Picnic Table
Aluminum Patio Wall
Fence of Plastic Strips

Installing and Landscaping Do-It-Yourself Swimming Pools

Pine Coffee Table
Sandbox With Cover
Metal Spinning on Wood Lathe
Chuck for Metal Spinning

Driving Aluminum Nails

Hugh C. Smith, Kaiser Aluminum and Chemical Corp., Product Div



When you have had a little practice, aluminum nails can be driven through sheet material without pre-punching holes or bending nails.

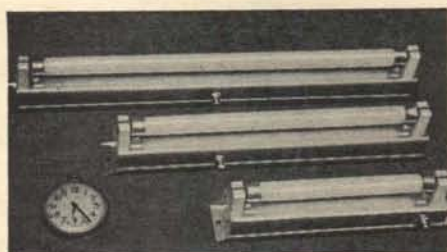
BECAUSE OF the noncorrosive and non-staining characteristics of aluminum, more and more nails made of this metal will be used, especially for exterior construction. Driving aluminum nails will seem strange the first time you use them, but remembering a few simple rules will prove that, "It's easy when you get used to them."

Aluminum roofing nails generally are formed with a screw or ring shank, and, for special uses with a very durable, chemically insensitive, compression-type washer. Start driving an aluminum nail with a slightly lighter hammer stroke in wood or through aluminum sheets. This is especially true with screw or ring-shanked nails, such as described. During the first tries with aluminum nails, stop if the nail hits an obstruction,

such as a knot. Either withdraw or break off the started nail and drive a new nail a little to one side. In the case of aluminum sheet material, drive the nail through the same hole, but at an angle to miss the obstruction. As you become familiar with the driving pattern of aluminum nails, you will be able to sink a nail into the heart of the hardest knot. The object is to lessen, rather than increase, the force of hammer blows when resistance is encountered. This not only permits the nail to penetrate the obstruction without bending, but also minimizes splitting or driving out knots.

A little practice, lighter hammer strokes and increasingly lighter strokes through obstructions will assure that driving an aluminum nail can be as easy as driving any.

Midget Fluorescent Fixtures



HAVE YOU BUILT any projects lately that would have been more attractive or done a better job if a miniature fluorescent lamp were included?

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4333 N. Pulaski Rd., Chicago 41



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A \$1000 life insurance policy can be yours to help take care of final expenses without burdening your family, if you are under 80. No obligation. No One Will Call. For FREE details write Crown Life, 203 North Wabash Ave, Chicago 1, Illinois. Dept. 265.



The charge for classified advertisements is 70 cents a word payable in advance by check, cash or money order. All classified set solid, without display, leaded, or blank space. All copy subject to publisher's approval. For clarity, please type or print your copy. Be sure that check, currency or money order accompanies copy. When figuring the number of words be sure to include name and address. For example: W. C. Jones, is three words. Send your copy in at once. Closing date for classified advertising is the first of the second month preceding publication. Minimum 19 words.

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225 STAMPS only 10c with approvals. Mystic, Camden 22, N. Y.

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KELSEY PRESSES, X-95, Meriden, Conn.

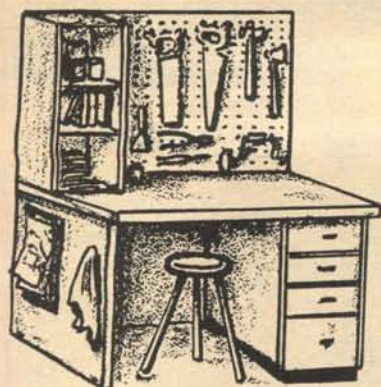
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- ▶ Address your notice to:
Change of Address Dept.

WORKBENCH

Handcraft Bldg. • Kansas City 11, Mo.

MAY-JUNE, 1961 » 61



Tin Protects Switch



If a non-watertight switch is located where it might occasionally be exposed to weather, as in a carport, a 1-lb. coffee tin can be used to protect it. Mount and wire the switch through holes punched in the bottom of the tin, which should be painted to prevent rusting. Fit the cover of the coffee tin in place when the switch is not used.

Daniel Bousha, Jackson, Mich.

Two-Voltage Test Lamp



Wire two 110-volt lamps in series using weatherproof sockets to provide a test lamp that can be used on both 110-volt and 220-volt appliances and circuits. On 220 volts the lamps will burn at full brilliance, on 110 volts, the lamps will burn at half brightness. Both lamps must be the same size, and should be as small as possible to reduce the heat problem when being handled.

Wayne Floyd, Fayetteville, Tenn.

WORKBENCH SHOP TIPS

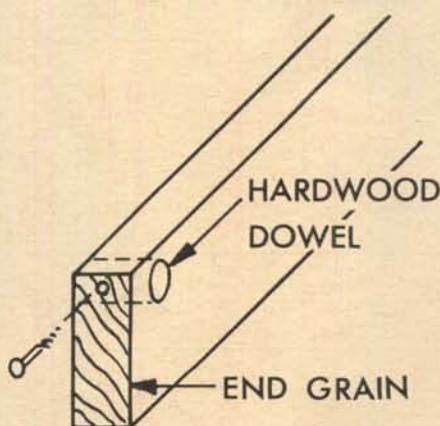
Oil-Can Hanger



Because of its rather awkward shape an oil can is difficult to keep handy around a drill press. Here is one way to solve the problem: Wrap a couple of turns of a length of heavy copper wire around the spout, then bend a hook in the extending portion. Solder the turns to the spout and the can now may be hung on any convenient hook.

A. R. Tanner, Jr., Poughkeepsie, N. Y.

Screws In End Grain



To get screws to hold well in the end grain of stock, drill a hole at right angles through the material and glue in a dowel. The screw then is driven so it enters the hardwood of the dowel. A pilot and shank hole should be drilled for the screw.

Howard E. Moody, Upper Jay, N. Y.

SawSmith Shelf



Owners of SawSmith radial-arm saws can add to the utility of the stand by fitting a shelf on the leg braces, as indicated. This one is made from $\frac{3}{4}$ in. plywood with sides $3\frac{1}{2}$ in. high. To facilitate brushing out sawdust, a $\frac{1}{4}$ -in. gap was left between the bottom and the back. The shelf bottom is bolted to the braces, the sides are fastened to the legs with sheet metal screws.

Ted Charles, Kansas City, Mo.

Finish On Wood Turnings

To quickly smooth and finish wood turnings, such as tool handles and the like, first sand the workpiece while it is rotating. Then, hold an oiled strip of cloth or leather against the work while it is turning. This applies and burnishes an oil finish on the wood and makes it glass-smooth.

M. Robert Beasley, Detroit, Mich.

Drip-Proof Paint Pail



Keep the ridge in the top of a paint pail clean by punching a number of holes in it with an ice pick or awl. The paint then drains back into the container; the holes are sealed when the lid is replaced.

F. Stebbins, Shawnee Mission, Kans.

Wax Fire Starters



One fine use for discarded waxed milk cartons is for fire starters. Cut a number of them down to a height of about 2½ in., then slit each corner to the base. Fold the resulting four tabs down over one another and secure with a rubber band. To start a fire, light one of the tabs and place the entire section on top of the tinder. The starters are not affected by moisture and will start a fire even in a light rain.

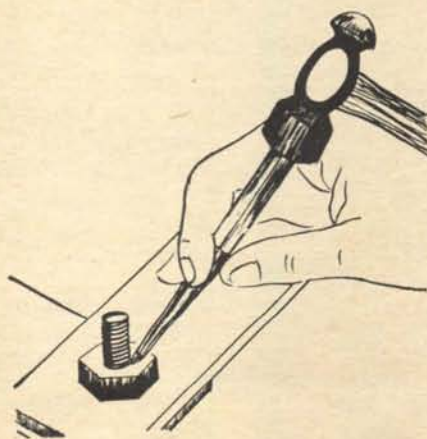
Bil Toman, Palatine, Ill.

Removing Painted Wallpaper

To remove painted wallpaper, wrap a sheet of coarse abrasive around a block of wood and rough up the entire surface. The abrasive will break the paint film so that steam or solvents will penetrate the paper.

Edward Bentley, Jackson, Mich.

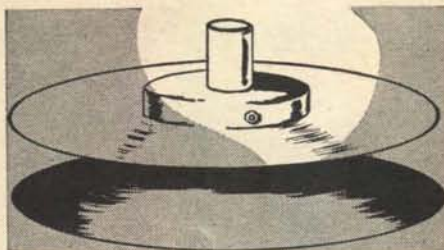
Punch Locks Nut



When you can't find a lock washer for a particular size nut and bolt, the nut can be "locked" in place by use of a center punch. Upset the thread just above the nut by driving the point of the punch into it. When the nut is removed later, it will recut the thread.

Daniel Bousha, Jackson, Mich.

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One craftsman who needed a jig to hold short lengths of dowel so that holes could be drilled in the ends, used a pulley. The end of each length of dowel is inserted in the hub of the pulley and held by turning in the set-screw. The pulley is easily positioned on the table of a drill press.

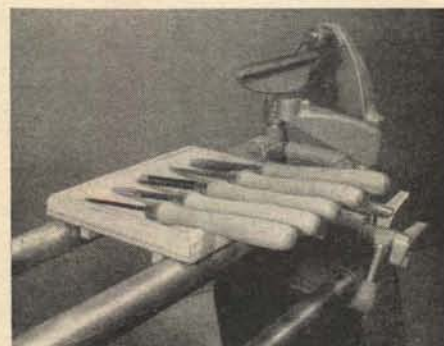
M. Robert Beasley, Detroit, Mich.

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Ned Charles, Kansas City, Mo.

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Number the outside squares of the pattern both horizontally and vertically. Now, using a piece of paper (preferably tracing paper) sufficiently large for the full-sized pattern, measure off the exact area you wish the pattern to occupy. Divide this area into the same number of squares as appears in the smaller pattern. Number the outside squares on the paper in the same manner as you have numbered the original pattern.

Copy carefully into each of the large squares the portion of the design that appears in each correspondingly numbered square of the original pattern.

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Manufacturers' Directory

A Look At the Stars, Page 5

"Starmaster" Telescope, Harmonic Reed Corp., 1111 W. Lancaster Ave., Rosemont, Pa.

All About Karting, Page 10

The Go Kart Club of America, Box 806, Azusa, California

Simplex Mfg. Co., 540 N. Carrollton Ave., New Orleans 19, La.

Sur-Tork, American Machine & Foundry Co., 261 Madison Ave., New York 16, N. Y.

Carry-All Trailers, Inc., SW Corner Island Rd. & Eastwick Ave., Philadelphia 42, Pa.

Azusa Engineering Co., 16200 Arrow Highway, Azusa, California

West Bend Aluminum Co., West Bend, Wisconsin

B & H Machining, Inc., R. D. 2, Somerset, Pennsylvania

500 Industries, Fremont, Nebraska

Clinton Engine Co., Clinton, Michigan

Scat-Cat, Inc., 2820 Roe Lane, Kansas City, Kansas

Standun Industries, 1418 E. Slauson Ave., Los Angeles 11, California

McCulloch Co., 6109 Century Blvd., Los Angeles 45, California

Rocco Products, Inc., 2916 4th Ave., Minneapolis 8, Minnesota

Go Kart Manufacturing Co., Inc., 6477 N. Irwindale, Azusa, California

Two Concrete Projects: Garden Bench and Downspout Deflector, Page 26

Kol Mixal Mixer, Kol, Inc., 2323 Ellis Ave., St. Paul 14, Minn.

Sakrete Concrete Mix, Sakrete, Inc., P. O. Box 1, St. Bernard, Cincinnati 17, Ohio

Do-It-Yourself Garage Door, Page 32

"Thriftmaster" Door, Crawford Door Co., Detroit 5, Michigan

"Compact" Swimming Pools, Page 34

Sunline Pools, Plastic Div. Doughboy Industries, Inc., New Richmond, Wisconsin

Transistor Garage-Door Opener, Page 36

Garage Door Opener, Perma-Power Co., 3100 N. Elston Ave., Chicago 18, Ill.

Five-In-One Router, Page 42

155 Router, Porter Cable News Bureau, Marcellus St., Syracuse 1, New York

3-Dimensional Duplicator, Page 44

"Turn-O-Carve", Turn-O-Carve Tool, Inc., 4240 Altadena Ave., San Diego 15, California

4-In-1 Combination Tool, Page 45

Ro-Comba Tool, Rozell & Sons, LaFontaine Ave., Wabash, Indiana

Miniature Ball Bearings, Page 47

Manufactured by New Hampshire Ball Bearings, Inc., Peterborough, N. H.

Miniature Tools, Page 51

Manufactured by Moody Machine Products Co., Inc., 42-46 Dudley St., Providence 5, R. I.

Camera-To-Binocular Adapter, Page 52

Adapter, Edmund Scientific Co., 101 E. Gloucester Pike, Barrington, New Jersey

Johnsonmobile, Page 53

Manufactured by Horton Johnson, Inc., 186 Hazel Ave., Highland Park, Illinois

Handy Tool Kit, Page 55

Handyman "Quick-Fix", The Stanley Co., 195 Lake St., New Britain, Conn.

Touch-Tape Switch

Manufactured by Gardiner Electronics Company, 2545 East Indian School Rd., Phoenix, Arizona

Driving Aluminum Nails, Page 59

Kaiser Aluminum & Chemical Corp., Kaiser Bldg., 1924 Broadway, Oakland 12, California

Midget Fluorescent Fixtures, Page 59

Shoplite Co., 650 Franklin Ave., Nutley 10, New Jersey

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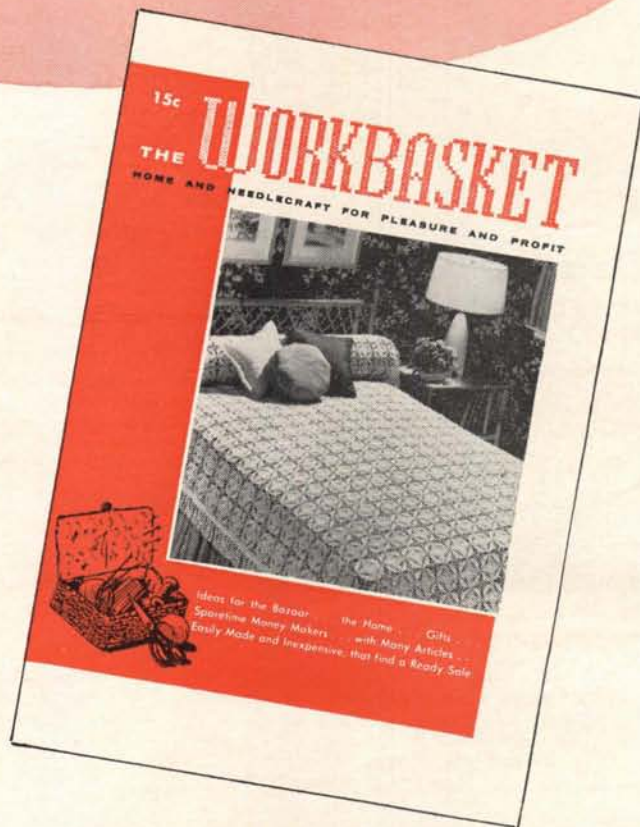
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